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THE

NATURALIST:

A
MONTHLY JOURNAL OF

NATURAL HISTORY FOR THE NORTH OF ENGLAND.

EDITED BY

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PREFACE.

IN succeeding the able and experienced editorship of Mr. W. Denison Roebuck, we asked the indulgence of the subscribers in our work. This has been amply accorded, and our best thanks are tendered for their practical aid and encouragement. This has made our task a pleasant one, and we anticipate with confidence a continued period of usefulness and increased value for the journal. Our thanks are also due to our numerous contributors for their continued interest, and the labour expended in producing papers of permanent value.

Special efforts have been made to enhance the value of the journal and sustain the interest of our readers by considerably increasing the number of illustrations. Whilst feeling assured of their appreciation, we must admit that the cost has been a tax on our resources. We wish, however, to gratefully acknowledge the generous aid in this direction both by contributors and subscribers, without which the journal would have materially suffered.

Everything has been done to publish the reports of the Yorkshire Naturalists' Union Field Meetings, etc., as promptly as possible.

Whilst it would be invidious to mention any particular paper in the Volume, we should like to make special reference to the contributions by Dr. Wm. G. Smith, on the Study of Plant Associations, which have been so widely read and favourably commented upon both at home and abroad. We have already had evidence that much work is now being done on the lines suggested by Dr. Smith in these pages.

The Editors have felt keenly the pressure on their space, and have been tempted on four occasions to double the monthly issue. This has so far increased the expenses that while we have to record a considerable increase of subscribers, a greater increase still is necessary to enable us to successfully cope with the matter in hand. If this be forthcoming it is our desire to increase both the number of pages and illustrations, as under the present circumstances we have to delay the publication of papers of considerable interest.

Mr. Roebuck has kindly prepared the Index to the Volume.

T. S.

T. W. W.

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THE NATURALIST

FOR 1903.

EDITORIAL.

THE NATURALIST—PAST

THE *Naturalist* is one of the few natural history magazines that has had an uninterrupted career for over a quarter of a century, and it can be said to have existed, with slight breaks, for nearly seventy years. The first series of *The Naturalist*, edited by B. Maund and W. Holl, and afterwards by Neville Wood, ran into five volumes, the last four being printed at Doncaster. This was between 1836 and 1839. The second series was edited between 1851 and 1858 by Dr. B. R. Morris, succeeded by the Rev. F. O. Morris. This was published at York, and consisted of eight volumes. The third series contained two complete volumes and one incomplete, and was published at Huddersfield under anonymous editorship between 1864 and 1867. The fourth set was also published at Huddersfield, commencing in 1875, and consisted of nine volumes, edited by Messrs. C. P. Hobkirk and G. T. Porritt. In 1884 the place of publication was transferred to Leeds, where it appeared under varying editorship until 1889, from which date it has been issued most regularly, edited solely by the present indefatigable President of the Yorkshire Naturalists' Union, Mr. W. Denison Roebuck.

AND FUTURE.

It is sincerely hoped that the change in the editing of the Journal, with the present issue, will not result in the magazine deteriorating in popularity or scientific value. As the organ of the Yorkshire Naturalists' Union it is necessarily of primary interest to Yorkshiremen, but its sub-title, 'A Monthly Journal of Natural History for the North of England,' defines its scope. It should be borne in mind that the future of the magazine depends upon the contributors. Every effort will be made to keep it of interest and value to northern naturalists, principally by the publication of original articles relating to their district, but also by recording within its pages particulars of any similar work appearing elsewhere. These will appear under 'Northern

Notes and News,' and copies of any papers bearing upon the natural history of the district should be forwarded to the editors for this purpose. Secretaries of Natural History and Scientific Societies are also urged to forward all their publications to this journal. It perhaps need hardly be stated how desirable it is that as many additional subscribers as possible should be secured. An increase in the subscription list would be the means of many improvements being effected, not the least of which would be an additional number of illustrations.

THE UNION'S PAST PRESIDENT.

Mr. Percy F. Kendall, F.G.S., whose recently-delivered presidential address is referred to on another page, has accomplished much for Yorkshire geology. Since his appointment at the Yorkshire College, Leeds, in 1893, many most complicated geological problems have been solved, and numerous excellent pieces of field-work have been accomplished. His frequent appearance on the excursions of various Yorkshire societies during recent years has unquestionably resulted in the study of his favourite pursuit being taken up by a whole army of enthusiastic workers, greatly to the advantage of the science. Such an impetus has been given to thorough scientific investigation by Mr. Kendall's energy and example, that it can be truly said his appearance in the county marks an era in the history of Yorkshire geology. Mr. Kendall is probably best known on account of his work on the glacial beds of the county. One of his earliest Yorkshire papers was 'The Glaciation of Yorkshire' (1894), whilst his latest, 'A System of Glacier-Lakes in the Cleveland Hills' (noticed elsewhere), is a truly remarkable piece of original work. Equally at home in other directions, however, he has added greatly to our knowledge of the underground waters of West Yorkshire, and the discovery of a fossiliferous horizon in the Millstone Grit at Eccup, near Leeds, has been such that its value, palæontologically, has not yet been fully realised.

THE PRESENT PRESIDENT.

Mr. W. Denison Roebuck, F.L.S., whose able editorship of this journal during the last nineteen years places every northern naturalist under a deep debt of gratitude, now occupies the post of honour in the Union. In addition to his editorial work Mr. Roebuck has conducted secretarial and other duties in connection with the Yorkshire Naturalists' Union, to the great

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advantage of that body, and of natural history generally. His favourite study is conchology—a branch of science greatly needing more workers in the county at the present time. In recognition of his researches amongst the mollusca he was elected President of the Conchological Society. The well-known ‘Handbook of the Vertebrate Fauna of Yorkshire,’ of which he is joint author, was published in 1881, and is indispensable to the student of Nature situated in our greatest county.

PRESERVATION, NOT DESTRUCTION.

There is no necessity to remind the readers of this journal that a Naturalist is essentially a preserver of the fauna and flora of his country, and that anyone in any way exterminating or destroying animal or plant life cannot claim that title. When wholesale slaughter of mammal, bird, or insect takes place, not merely to adorn the cabinet of the collector, and to provide him with suitable exchanges, but purely for pecuniary purposes, the perpetrator has certainly no claim to the name, but should be styled ‘slaughterer’ of the very worst type. We had hoped that the passing of the ‘Wild Birds Protection Act, 1902,’ recently referred to in these columns, together with the efforts of the Society for the Protection of Birds, and various field clubs, would have put a check to the slaughter of our rarer wild birds, or at any rate would have prevented any publicity being made by dealers of their cruel, one might almost say ‘criminal,’ ways. Yet this is not so.

A SCARBOROUGH ‘NATURALIST.’ (?)

A printed ‘Price list of birds in the flesh for stuffing,’ issued by a Scarborough dealer who styles himself a ‘Naturalist,’ has recently been placed in our hands. A more atrocious and bare-faced document it would be difficult to imagine. It requests the purchaser to order as early as possible, ‘as many of the species named are only obtained on migration,’ and the ‘Naturalist’ will do his best to procure *any* other species the purchaser may require. He also has a large stock of British birds’ eggs in clutches, with data, for which a special list is published. We are further informed that ‘all birds are clean, fresh, and in good condition, being sent per Parcel Post *immediately after being shot.*’ The list contains the names of no fewer than ninety-four British birds, nearly all of which are of rare occurrence, and not one in the list deserves the fate of this ‘Naturalist’s’ gun.

PRICES PAID FOR BIRDS' LIVES.

From the 'price list' we learn that sixpence will buy a freshly-killed Pied Wagtail, Meadow Pipit, or Skylark; a Rock Pipit, Fieldfare, Redwing, or Jackdaw can be secured for ninepence. 'Grey Gulls, for screens, etc, 10s. *per dozen*'! Kingfishers, Owls, Divers, Buzzards, Grebes, Swans, Petrels, Terns, and Ravens are priced, and last, but not least, a *Golden Eagle*! In many cases two prices are given, the higher being for 'choice, adult birds only.' Copies of recent testimonials are printed, the authors of which are surely almost as wicked as the dealer. The initials and addresses of the writers are given. A customer at Clown, near Chesterfield, writes:—'I am quite delighted with Razorbill you have sent. It is a beauty; try and get me another.' A Halifax customer says:—'I must say that I am highly pleased with the Kingfisher; it is in grand condition, and you must let me have another the first time you have the chance.' As we are informed in bold letters that the 'Originals may be seen on application,' it is to be hoped that someone will apply for these letters, and let us know who encourages dealers in their cruel and destructive work.



JAMES MOTLEY AND HIS HERBARIUM AT SWANSEA.

ARTHUR BENNETT, F.L.S.,

Croydon.

THE collection from which the interesting records are given by the Rev. H. J. Riddesdell in the November *Naturalist*, p. 343, was formed by Mr. James Motley, of Aberafon, Glamorganshire.

He was a member of the London Botanical Society, and contributed plants to that Society, among them *Malva verticillata* L., which he discovered in 1845 in fields near Llanelly, Carmarthenshire, and showed Mr. Bower the plant growing there. He sent a note to the *Phytologist* (p. 973, 1847) on its occurrence, and also noted under *Euphorbia Peplis* L.:—'When quite a boy I found this plant growing abundantly on sandhills at Porth Call in Glamorganshire, accompanied by *Lavatera arborea* and *Tamarix anglica*,' but the two former were gone in 1841. He went out to Labuan in Borneo, and was murdered by Mohammedan settlers.

See *Phytologist*, pp. 934, 973, 1847, and 221, 1848. Biog. Index Brit. and Irish Botanists, p. 124, 1893.

BOTANICAL SURVEY FOR LOCAL NATURALISTS' SOCIETIES.

WILLIAM G. SMITH, B.Sc., Ph.D.,

Yorkshire College, Leeds.

It has frequently been suggested, since the publication of the first two maps of a method of botanical survey new to Britain,* that the local Naturalists' Societies should undertake regional surveys of this kind for their respective districts. The subject has been discussed at the conference of delegates from societies to the British Association both at Glasgow and Belfast. As yet, however, we have heard of no contribution to the survey from any society, although we know of about a dozen individual workers who have the survey in hand in different parts of England and Wales, Scotland, and Ireland. In Yorkshire three of us have during the past three years endeavoured to continue the botanical survey, and hope soon to place the results at the disposal of naturalists in the county. The work has brought us into contact with several botanical members of the Yorkshire Naturalists' Union, who have become interested in the work, and have induced the Union to ask us to link ourselves more intimately with it. It seems natural that men familiar with a neighbourhood after years of observation should be useful colleagues in such a survey. They have already given most valuable aid both in Yorkshire and in Scotland. Yet we have not succeeded so well as we might, and my experience is that a local botanist, however willing and able he may be to assist, has a certain difficulty in grasping the method. Even local floras, including Mr. Baker's 'North Yorkshire,' to our mind the best of all, are disappointing when consulted for botanical details. On the one hand, we have the local societies willing to assist in botanical survey, a work which claims their interest, and which lies within their sphere. On the other hand, there are the few workers who have, more or less single-handed, attempted the work, and find themselves unable to get much assistance from the local botanical records or the local societies. Why should this be so? The Y.N.U. has recently appreciated the difficulty in appointing a committee for botanical survey, and appointing to it representatives of both classes. It seems

* Smith, Robert, *Botanical Survey of Scotland*: 1. Edinburgh district; II. Northern Perthshire. John Bartholomew & Co., Edinburgh, 1900.—Also *Scot. Geog. Mag.*, July and August 1900.

therefore an opportune time to consider the difficulty and to propose some way to its solution.

There are two distinct points of view in regarding the plant-life of a district. The existing literature on plant-life embodies the past work of botanists and local societies ; it regards plants almost entirely from the floristic point of view. The botanical survey, on the other hand, considers the vegetation of an area. The floristic method of study has as its first object the preparation of lists of species found in a certain area—parish, county, or country—and the recording of their relative frequency or rarity ; the species in the lists are arranged under genera, natural orders, etc., the whole constitutes the flora. The next step is to consider the distribution of the species and genera over the earth, to find where they occur, where absent, and to compare one flora with another. Other questions of floristic interest are the origin and migration of species, the present conditions of existence, and the history of development. The botanical characters of most importance in the study of flora are those of the race, particularly the floral organs. In Yorkshire we have a Flora for each of the Ridings, and several local Floras. These are indispensable aids in the method now advocated, they form a most valuable basis for further work, and we are extremely fortunate in possessing them.

In considering the vegetation, the first step is to find out what plants grow together under similar climatic conditions and soil (edaphic) conditions, and to ascertain the essential characters which adapt the plants of such a community to their particular environment. Thus a peat bog, a dry heath, and a limestone scar each represent an area of uniform environment ; the list of species covering any one of these, includes plants belonging to widely different genera and natural orders, they have no kinship in the floristic sense, but they are related in that all are adapted to live together under certain conditions, the essential characters being found mainly in the leaves, stems, roots, and other vegetative organs. The species found in a particular environment constitutes a plant-association, and, by arranging them in the order of their frequency, a picture of the vegetation of the selected area is conveyed to the botanist. By placing together the various plant-associations one may reproduce the whole vegetation of a parish, a river-basin, or a country. It is then possible to compare the distribution of vegetation with climate, soil, and other factors of environment. The study of vegetation thus becomes a study of plant-associations.

The scheme which we now propose is essentially this: to study plant-associations. These are the parts which together make up the vegetation, but at the present time there is a general ignorance about the composition of these essential elements. In setting this as the work of local botanists, it is not forgotten that to them botany is a hobby taken up during a leisure more or less limited, and it cannot be expected that they can give the time necessary for the full and detailed studies which a complete study of vegetation entails. The making of vegetation maps, such as attempted in Yorkshire and elsewhere, should for the present be taken up only by those whose mode of life allows of a long and careful training in botany in all its aspects, including some knowledge of allied branches of science. A course similar to what we now propose for the preparation of a vegetation survey has been followed in compiling the existing floras. The local worker who carefully observed and recorded the species of a district has laid the foundation for the preparation of a parish or county Flora; the sum of those local Floras is that of the whole country.

The suggestion that local societies and individual workers should provide records of plant-associations introduces two questions: (1) What is a plant-association? (2) How are the records to be made?

On a recent occasion (British Association, Glasgow, 1901) we dealt with the first question thus:—‘The plant-association may be defined as a community or society of plants living together and adapted to certain conditions of environment. In each association there are—(1) one or more dominant social forms, (2) secondary or sub-dominant forms struggling for dominance, (3) dependent species. For example, a natural wood consisting entirely of oak trees has one dominant form—the oak—whose presence is determined by the prevalent climatic, soil, and other conditions, while its size and gregarious nature give it dominance; in this wood there may be other trees or shrubs (e.g., birch, mountain ash, or hazel), more or less isolated, but which, given the opportunity by removal of the oak, will become dominant forms; the motley carpet of the oak wood is made up of many species dependent on the larger forms for shelter and shade, or living as epiphytes, parasites, and humus saprophytes, and including not only flowering plants, but ferns, mosses, lichens, and fungi. The association is thus a mixed community with complex relationships, its members struggling for existence and dominance, but it is a coherent

whole, and may be studied as a unit. The association may be considered broadly, or it may be limited to a few species; the recent tendency is to make the term comprehensive and wide.' The whole vegetation of Britain may be regarded as a type agreeing generally with that of Central and Northern Europe, and we find it so represented on existing maps of the vegetation of the world. In Britain the type may be subdivided into a lowland forest zone and an upland treeless zone, although cultivation of the land and other influences of man have well-nigh obliterated all traces of the real extent of these in primitive times. In Yorkshire there is evidence that forest covered the whole of the lowlands up to or beyond the present valley or clough-head belt of woodland, but there remains to be solved the question whether this forest covered the high plateau up to over 2,000 feet above the sea, as it did in Northern Scotland. The British forest zone includes several distinct types of forest or woods. Thus in Yorkshire we have distinguished:—

- (1) Lowland Beech woods on and eastwards from the Permian tract.
- (2) Lowland Oak woods.
- (3) The upper Oak belt in the narrow Millstone Grit valleys.
- (4) The Ash-Hazel copse of the Mountain Limestone.
- (5) Pine woods.

These five kinds of woods we suggest as associations suitable for local workers to record. Whether these include all the woodland associations is a question to be solved by the kind of records we propose. Thus the distinction of the upper oak belt from the lowland oak woods is the result of careful comparisons of the plants occurring in them, made by Messrs. W. B. Crump and C. E. Moss, when preparing the Flora of Halifax; their results were further confirmed by workers in the Huddersfield district.

Turning now to the moorland, the treeless region of the present day, we find here certain well-marked types of vegetation. In the Yorkshire botanical survey we distinguish:*

- (1) The Cotton-grass Moss, Moor, or Peat Bog of the high Millstone Grit plateau.
- (2) The dry Heath or Heather moor.
- (3) The Grass Heath, where grasses predominate with heath plants intermixed.

* A useful paper on these has just been published by Mr. C. E. Moss, who carried out the botanical survey in South-Western Yorkshire (*Halifax Naturalist*, December 1902).

- (4) The Hill Pasture or Natural Pasture of the Limestone dales, in which grasses predominate but the heath plants are replaced by other species.

The above may be regarded as types or primary associations of plants; their occurrence depends on well-defined differences of soil, soil-moisture, climate, and, to a certain extent, on the influence of man. If a botanist were to attempt to record them in the way we suggest, he would find that each included several secondary associations depending on more local conditions. We have not attempted to indicate these latter associations in the maps of the Yorkshire survey, but their composition is dealt with in the text; in a future paper in this journal we propose to consider them in more detail.

The hydrophytic vegetation of marshes and swamps also presents well-marked plant-associations. Thus the marshy vegetation of the moorland gathering grounds of streams contrasts strongly with the marsh vegetation of the slow waters of the flat lowland.

Method of recording plant-associations. It is advisable that the records should be taken in a way which will admit of easy comparison. At this early stage, however, it is only possible to sketch briefly a plan which will no doubt require modification as time goes on and experience is gained. It will be one of the objects of the committee on Botanical Survey to frame a workable method of making records. The first step in the case of starting a record is to select a place where the vegetation is fairly uniform, for example, a wood, a portion of a moor, or some swamp. The size of the area is of minor importance, although there are many advantages in having it as large as possible—say, at least an acre. The identification of the place should be ensured by colouring it on a ‘six-inch’ Ordnance Survey map, or by tracing its boundaries from the ‘25-inch’ map into the record book. For each plant-association dealt with there should be a record book, suitable for carrying and using out-of-doors; for the present we suggest a quarto book of 100 pages ruled in squares. The information given may be arranged under the following heads:—(1) Topography, (2) Flora, (3) Biology.

(1) The Topography includes all details about the station itself. The following are factors likely to influence the vegetation, and therefore to be recorded:—(a) Altitude above the sea, approximate slope, and exposure to north, south, etc. (b) Geology and soil: the recognised name of the geological formation, the character of the rock, the dip of the strata, and the

mode of weathering of the rock into soil ; in this work the aid of geological co-workers could be profitably called in. Notes on the soil should include (*a*) the texture and character of the soil and subsoil, (*b*) the state of the soil-moisture, whether always wet or periodically dry, and whether drained or not. Special attention should be given to the relation of the soil to the underlying rock, whether the soil is immediately derived from it, or whether the rock has become covered up by peat, glacial deposits, or recent deposits. (*c*) Climate : including the temperature at different times of the year ; rainfall and its distribution throughout the year, as well as dew, fog, or other atmospheric moisture. Where water is present in the selected area, its temperature should be noted as frequently as possible.

(2) The Flora or record of all the species found on the area is intended to show the constitution of the plant-association ; which species are dominant, sub-dominant, and dependent, as already indicated (p. IX.) ; also which plants are (*a*) characteristic of the particular association ; (*b*) common, *i.e.*, species which are abundant, but not confined to this association ; (*c*) occasional or intruders from other associations. The final list can only be arrived at after a series of visits, and the following method of keeping records is recommended. On the first visit make a rough list, then enter the species observed in the record book (following the order of the London Catalogue, or a standard Flora). An example may simplify :

<i>First Page.</i>			<i>Three Pages.</i>	
			4th April.	20th May.
TREES & SHRUBS.				
Ilex Aquifolium L.	Sub-dominant.	Scattered.	Old leaves.	First flowers.
Quercus Robur L.	Dominant.	Thinly planted ; loose canopy.	In bud.	First leaves and flower.
Betula verrucosa Ehrh.	Sub-dominant.	Scattered ; more where no oak.	In bud.	Flower.
HERBS.				
Ranunculus	Dependent.	Many patches, moist places.	Late flowers.	—
Ficaria L.				
Scilla festalis Sal.	„	Several large patches.	Young shoots.	Flower.
Pteris aquilina L.	Sub-dominant.	„	—	Young leaves.

Four pages are necessary for each set of records. On the first page the names occupy the margin, while the rest of the page is left for notes ; the three following pages are left for the entries made on each visit. In entering the names of plants after the first visit, vacant lines should be left so that any observed later

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may be inserted. In a system of this kind it is only necessary to write the names of species once; on each visit all that is required is to indicate in the proper column the condition of the plant. The noting of the phases of growth during the year enhances the value of the list, and provides accurate details as to time of leaf-unfolding, flowering, fruiting, etc.; while it enables one to distinguish the spring from the later summer flora, and this, in the case of woods especially, is important.*

(3) The Biology includes notes on the adaptations of the various plants to their environment, while remarks too long to include in the Flora lists would also find a place here. The biological details could not be attempted fully for every species found, and we suggest that only characteristic plants be thus dealt with. There is a wide scope for observations on even our commonest plants, and this part of the survey should on no account be neglected. The botanist who has followed recent work will here have the advantage, but we believe that with some guidance even a beginner would soon be able to record the life of some one plant.

Each worker may begin with one association and extend his operations. This may be done either by recording associations quite distinct in character (*e.g.*, a moor, a wood, and a marsh), or by comparing different areas with similar vegetation (*e.g.*, several oak woods). At first there is no need to attempt to study a whole parish or other area, but simply to work at several isolated associations in the way just indicated.

What results are to follow from the work recommended?

(A) Personal. Exact observation and the reproduction of what the eye perceives is the basis of science; in this respect the scheme suggested will prove a valuable training to the field naturalist. The scheme aims at more than mere identification of plants; it will train in observation on the social conditions and life of plants. Common plants will, in time, become familiar, not only by their flowers, but by their leaves and other organs, and the winter period will furnish material for observations quite as interesting as the summer. Not only will an increased interest be given to out-door botany, but many questions will arise which will be best answered by indoor observation or examination with the aid of the microscope; books, including

* Mr. T. W. Woodhead (Huddersfield) has recently shown me maps of woods prepared by members of the Huddersfield Nat. Soc. These represent in a very graphic way the arrangement of plants in a wood, and it is to be hoped that an account of this method will be given in these pages, so that it may be incorporated into the working plan.

those describing the vegetation of foreign countries, will have an increased value. After an association has been carefully studied, it will form a suitable topic for a paper to the Society, and we venture to predict that there will be less difficulty in finding topics for discussion at meetings of societies than at present.

(b) The Society. When a local Society has sufficient workers it will be possible to obtain accurate information on all the plant-associations of a neighbourhood. The records should therefore be lodged with the societies, probably after being read as papers. In such a series of records of associations, there is the basis of a map of the vegetation, and a more complete survey than has yet been attempted. After the experience gathered by work of the kind suggested, a vegetation map would be a practicable and useful work for the Society, and would form part of a more complete regional survey.*

(c) General. The work of individuals and societies, if properly recorded, would be available in many ways. The value of local Floras could be greatly extended if their pages gave more information on the vegetation of a district, in addition to the floristic details which at present are too often given in a dry and stilted manner. Mr. Crump's 'Flora of Halifax' is an example which we venture to quote. The flora is searchingly dealt with in the manner usually found in Floras, but, in addition, the habitat or station of a species is described in a way which enables its place in the vegetation to be recognised. In the Introduction the more important plant-associations are described, and, so far as we are aware, this is the first attempt of the kind made in Britain. The result is that the Introduction as a description of the parish may be read with interest by a general reader, who would never refer to the purely floristic part. As a contrast take the usual Flora of a district. In 'North Yorkshire' we have a description of the various districts, with an account of the geology, lithology, and climate of the whole, presented in a way which makes it of the utmost value; whereas the description of the vegetation is a representation from which a stranger could hardly form a picture of this interesting area.

The work of the local societies would form part of the survey of vegetation already begun in Yorkshire. In the parts as yet untouched, namely, the North and East Ridings, the work done

*A useful paper on the work of local societies in preparing regional surveys, written by Miss Newbiggin, is given in *Scottish Geographical Magazine*, December 1901.

by local men would be of great use in completing the survey. Situated as we are the completion of this work will take many years unless more colleagues are available. We have been, so far, fortunate in securing two co-workers, who have heartily entered into the more laborious parts of the work, and but for them the botanical survey could not have progressed so far as it has. It is now generally recognised that the botanical survey could profitably be extended over the whole of Britain, and sufficient work is now being done to give hopes that this may be so. In the wider sense as applied to Britain the botanical survey provides material, not only for the botanist, but for other scientific workers. The relation of vegetation to altitude is rendered evident in a way which admits of rapid comparison. The influence of climate may be traced from the maps by the meteorologist or geographer who has some knowledge of common plants. A distinction between the vegetation of the eastern side of Britain and the western is already evident, especially when one refers to my brother's unfinished field-maps of parts of western Scotland and to the Yorkshire maps. The method renders the maps of use to the geologist, and a relationship between the geological—especially soil maps—and the vegetation maps has already been shown in a way more convincing than hitherto. As the study of associations proceeds it becomes more evident how many plants of our flora are bound up into definite communities, although all do not thus fall into distinct groups. Detailed studies of the morphology and anatomy of selected species are suggested as a profitable field for observations likely to throw more light on the relationships of plants to their environment. From an economic point of view the maps are useful guides. They show the dominant woods of an area and indicate what trees are likely to be profitably grown there. The distinction of grass moor from heather is a guide to its value as grazing or shooting grounds respectively, and an approximation of the area available for each purpose may be attained.

The scheme here suggested, that local botanists and local societies should prepare material for the larger survey, is an experiment which we should like to see tried in Yorkshire, and through the Y.N.U. Committee it should be easy for workers to keep in touch.

Amendments and additions will follow as experience is gained, and, after a good working scheme has been obtained, we should be in a position to assist other societies beyond the county

YORKSHIRE GLACIER-LAKES.

FOR many years there has been a discussion amongst geologists as to whether the glacial deposits were deposited under water, or by land ice. The members of the old school advocated the former, whilst the 'neo-glacialists' are in favour of the latter. The late Professor Carvill Lewis, a most enthusiastic and far-seeing American geologist, visited England in the eighties, and unquestionably his work in this country marked an era in the history of glacial geology. From that time the supporters of the marine origin of the drift became fewer and fewer, and to-day they are but rarely met with. The appearance of the *Quarterly Journal of the Geological Society of London* for August 1902 practically puts the official seal of the austere council of that Society upon the discussion in favour of the glacialists. It is unquestionably a remarkable number of the journal, and the Fellows have never previously seen the like. Of the 270 pages contained within the covers no fewer than 100 pages are devoted to a paper, 'On a System of Glacier-Lakes in the Cleveland Hills,' by Mr. P. F. Kendall, F.G.S., and nearly 40 pages to 'The Glaciation of Teesdale, Weardale, and the Tyne Valley,' by Mr. A. R. Dwerryhouse, M.Sc., F.G.S. The former contains the results of eight years' work upon the Cleveland area by the ex-President of the Yorkshire Naturalists' Union. It is divided into ten parts, viz.:—(1) Introductory; (2) Modern Extra-Morainic Lakes; (3) Pleistocene Lakes, and the Criteria for their Recognition; (4) General Character of the Abandoned Channels; (5) Pre-Glacial Level of the Land; (6) Glacial Deposits and Glaciation of the Cleveland Area; (7) The Ice-Sheets; (8) The Extra-Morainic Lakes, I. The Vale of Pickering; II. Newton Dale; III. The Eskdale System of Lakes; IV. The Lakelets of Northern Cleveland; V. The Low-Level Phases of Lake Eskdale; VI. Iburndale; VII. The Eastern Coastal Tract, (a) Robin Hood's Bay, (b) Peak to Cloughton and Hellwath to Harwood Dale and Burniston, (c) Burniston to Scalby, (d) Scalby to Filey; VIII. The Vale of Pickering: Eastern End; (9) Sequence of the Ice-Movements; (10) The Sea-Outlet of the Lakes. Each of these is dealt with in detail, the field notes, containing particulars of the sections, etc., upon which the conclusions are based, being exceptionally valuable.

Mr. Kendall has been unable to detect any signs of the presence of the sea in the Cleveland area at any time during the

Glacial Period. Three main ice-masses appear to have been concerned in producing the deposits: one from the Southern Uplands of Scotland and the Solway, joined by the local ice of the Tees; a second originating in the Tweed Valley, and driven southward round the Cheviots by the pressure of the third, or Scandinavian, ice-mass. The general order of events is supposed to have been (1) the unobstructed passage of the Teesdale glacier to the coast; (2) the arrival of the Scandinavian ice; and (3) the invasion of the Scottish ice.



Eller Beck and Fen Bogs.

The first of the extra-morainic lakes described is that of the Vale of Pickering, the lowest of the sequence, which for a long period received all the drainage of the district except that of the western margin, and the outflow from which into Lake Humber is now occupied by the River Derwent. Newton Dale was the outflow of the lake-series of the Eskdale country. The Eskdale system comprises a series of lakes connected by an 'aligned sequence' of overflows, and here it is possible to trace the consequences of the shrinkage of the ice-masses, and to follow out the low-level phases of the lake. The ice pressing upon the northern face of the Cleveland Hills gave rise to

a series of lakelets, connected with which are the following set of overflows:—Scugdale and Scarth Nick, Bilsdale, Kildale, Ewe Crag Beck, Tranmire, and Egton Moor. Iburndale contained a lakelet overflowing eastward. Behind a narrow coast-strip of country, extending from Robin Hood's Bay to Hunmanby, there runs a gorge which receives all the drainage of the 'hinterland' and carries it into the Vale of Pickering. In the production of this arrangement the effects of an ice-sheet shutting the seaward ends of the valleys is traceable; the position of the main overflows was stable, and the drainage was permanently deflected.

In dealing with the sequence of the ice-movements, evidence is brought forward to prove that the Teesdale ice was the first on the ground in question, but none of the lake phenomena has been correlated with this first phase. The second phase was the complete diversion of this ice in the Vale of York, brought about by the growth of the Scandinavian ice-sheet. The third is the invasion of Scottish-Northumbrian ice, which may have passed out to sea and been driven inland again, carrying flints and smashed sea shells with it, and may have extended as far as Lincolnshire on the south and Whorlton on the west.

In the matter of illustration the Geological Society appears to have excelled itself. Mr. Kendall's paper is accompanied by no fewer than 34 illustrations in the text (maps, plans, sections, etc.), three plates of photographs, and six large folding maps. Undoubtedly this work constitutes 'one of the gems of glacial literature.'

The paper by Mr. Dwerryhouse is a continuation of the same principles applied to another area, and is likewise an exceedingly valuable piece of work. It also is illustrated by sketches of sections, photographs, maps, etc. Mr. Dwerryhouse describes the Topography and Structure, Glacial Deposits, Glacial Striæ, Boundaries of the Ice at the Period of Maximum Glaciation, and the Glacial Lakes and Glacial Channels of Teesdale, Wear-dale, and the Valley of the Tyne.

The accompanying illustration, used by permission of the Geological Society, is from Mr. Kendall's paper, and is a view of Eller Beck and Fen Bogs from the north-west, showing the 'intake' of the Newton Dale overflow channel and the contrast between the contours of the Eller Beck and Newton Dale valleys. The watershed is at the sharp bend of the railway.

THE MODERN METHOD OF STUDYING AGARICS.*

GEORGE MASSEE, F.L.S., F.R.H.S., V.M.H.

Royal Herbarium, Kew; Chairman of the Yorkshire Mycological Committee.

DURING the preparation of a recently-published work on European Agarics I was so much struck with certain observations bearing on the complex affinities and distribution of various species, that I have ventured to briefly allude to the subject here.

In the first place, when dealing with the entire body of European Agarics—or gill-bearing fungi—it becomes obvious that many widely-distributed species have been described under different names in different countries. Secondly, many modern species are in reality nothing more than slightly modified forms of older and in many instances well-known species; the modifications being in some instances of the nature often termed geographical races, in others more restricted local variations. In this connection the point to remember is the fact that these modern so-called species still retain the distinctive specific features of the older species from which they have been snipped, and the local variation is the feature that has decided their elevation to specific rank. The reason for this state of things is not far to seek. It is mostly due to the fact that such species are made by persons whose acquaintance is confined to the fungi of one country, or even part of one country, and consequently whose knowledge of the range of variation of any given widely-distributed species is necessarily imperfect. Again, the true or constant specific points that separate allied species are always few in number and quite independent of any local or geographical accessories that may predominate in any given locality, yet how many mycologists could reel off on the spur of the moment the true specific characteristics of any half dozen species of fungi of their own selection.

I can readily imagine that if phanerogamists, entomologists, etc., condescend to read this résumé, they will be inclined to form a poor opinion of mycologists after this confession; nevertheless, let them test themselves honestly in their own special subject on the above indicated lines. It is comparatively easy after years of field work to name correctly almost any species encountered, but it is quite another matter to know exactly those few constant points of distinction—specific characters—

* Paper read at the Y.N.U. Fungus Foray, Egton Bridge, 1st. Oct. 1902.

that separate one species from another. One method is rule-of-thumb, the other scientific.

Another feature too obvious and general to escape attention was the fact that in the case of large genera distributed throughout Europe, the extra British species could be sandwiched between British species. What I exactly mean is this, supposing three British species to be characterised by three characters each, represented by 1, 2, 3; 4, 5, 6; 7, 8, 9 respectively, then we find three extra British species characterised respectively by some other combination of these same characters, thus, 1, 3, 4; 2, 4, 7; 3, 8, 9, etc. This point was illustrated more clearly by means of coloured diagrams of British and exotic species of *Lepiota*.

In the majority of even the largest genera of Agarics there are not more than half a dozen constant specific points of distinction, and it is the correlation of two or more of these characters that constitute a species. Consequently when these distinctive features of a genus are once evolved, it seems possible to have as many species produced as there are possible combinations of the primary factors.

Now the above significance of the term species, as understood by students of the Agarics at the present day, opens up a wide field which can only just be alluded to at present.

Briefly it means that the species of Agarics are not of the same value as the species of Phanerogams or of the higher animals. In the latter each species, in addition to bearing the generic marks, possesses at least one specific mark peculiar to itself, in addition to the variously modified marks characteristic of allied species.

In Agarics this is not the case, the species having no individual special characters, but are made, as described above, by the varied combinations of generic characters.

Hence genera, or sections of large genera in Agarics, are only equivalent to species of the higher plants and animals, whereas the so-called species of Agarics are merely forms of such genera or sections, slowly approaching the status of species in the higher sense, but as a rule yet lacking the hallmark of a true species in the absence of specialised individual characters.

Such species in the process of evolution fit in beautifully with the views of De Vries, expressed in his celebrated work on the theory of species formation by mutation; and it is certain that if this celebrated botanist had been a mycologist he would have

found more convincing proof of the truth of his theory by a study of the Agarics, than that afforded by such genera as *Cenothera* and *Epilobium*.

At last I am approaching the modern method of studying Agarics. The scheme of classification of the higher Fungi devised and perfected by Fries is the one generally followed at the present day, and although the distinctive features were seen by the naked eye, or at most those seen under a pocket-lens, yet it is remarkable how generally accurate Fries was in the formation of his genera, as shown when tested by modern morphological and microscopic characters. The same may be said of Fries' species, which are in the majority of instances supported by modern microscopic research. Of course there are instances where minute spore characters, etc., show that Fries had lumped allied species, which he himself would doubtless have separated, had the microscope been perfected as at present, in his time. These remarks show that at the present day we have unfortunately lost the power, to a very great extent, of detecting those minute naked-eye characters which were obvious to Fries and other observers of his time. At the present day too many students depend almost entirely on microscopic characters, which at best have as yet to be proved to be of greater value than naked-eye characters; both have their special merits and uses as aids in the discrimination of species, but in studying Agarics it must ever be borne in mind that many very important points can only be seen by the naked eye; points which give great insight into the method of life of the living plant, as quite apart from ascertaining its name, etc.

In the latest work by Fries on the classification of the Agarics, the very large genus *Agaricus* is divided into primary groups depending on the colour of the spores, as shown in the mass when deposited on paper. This arrangement, as Fries was very careful to emphasise, broke up a very large number of species into groups, which on the whole made it easier to run down any given species, while at the same time it widely separated closely allied genera, as is inevitably the case when artificial characters are used as a means of quickly ascertaining the name of a particular Agaric or other organism, vegetable or animal.

This division of the Agarics into purely artificial sections depending on the colour of the spores alone, has been followed by all modern mycologists, perhaps mainly as a quick means to an end, that of ascertaining the name of a species, and the sections

indicated by Fries under these colour-groups have been raised to the dignity of genera. This state of things was certainly not intended by Fries, whose sub-genera of *Agaricus* as contained in all his works previous to his last popular book—*Hymenomycetes Europæi*—were composed of members included respectively in each of his artificial colour-groups.

Modern methods of research, unknown to Fries, prove that on broad lines his conceptions of generic affinity were correct, and that the modern genera included under sections founded on the colour of the spores are artificial, and as stated above only represent portions of true genera, representatives of which are not unfrequently scattered throughout all the colour-groups of the old genus *Agaricus*.

The generic characters employed by Fries were the presence or absence of a volva or ring, mode of attachment of the gills to the stem, texture of stem, etc., all naked-eye characters. The modern method, which supplements the macroscopic characters employed by Fries, depends on the microscopic structure of a transverse section of a gill. Numerous experiments have proved that the gill structure is very characteristic and constant for each genus, and tallies in the main with the genera as indicated by Fries, but being more constant than the naked-eye characters, enables a doubtful fungus to be placed in its correct genus when other marks fail to do so. As an example the modern method depending on morphology proves that the modern genera *Tricholoma*, white spores; *Entoloma*, pink spores; *Hebeloma*, brown spores; and *Hypholoma*, purple spores, only form collectively one genus. This is only what was shown to be the case by Fries, and evolved from macroscopic characters alone; yet it is interesting to have this idea corroborated by an entirely different method unknown to Fries. Similar lumpings of other groups of modern genera can also be demonstrated by the same microscopic characters, and was illustrated more satisfactorily by means of diagrams than is possible by writing.

Finally, I would venture to suggest to the members of the Mycological Section of the Union the desirability of adding a drawing of a transverse section of a gill to every drawing of a fungus made; preferably the magnification should be 400 diameters, the acknowledged standard amongst mycologists. If this were systematically done, we should be able to relegate to their proper genera the numerous species whose proper position is at the present day uncertain or debated.

NOTES ON DERBYSHIRE ANNELIDS.

REV. HILDERIC FRIEND,

High Wycombe.

IN September 1902 I was able to spend a few days in the Peak District, making my headquarters at Park Hall, Hayfield, the Guest House of the Co-operative Holiday Association. During that time I paid some attention to the Phanerogams, Fungi, and Annelids, and though the flowering plants were not numerous the worms proved worthy of study, the more so as I do not find a single note among my books and memoranda relating to the Annelids of Derbyshire. I regret to say that two or three species were not determined, owing to my books being all packed. I give a list, however, of those concerning which no possible doubt can exist. The district as a whole does not seem to be specially favourable to worms. Peat, Millstone Grit, and the related soils and rocks do not afford the nutriment in which our earthworms delight; but the rich mould under the trees in woods and by the side of woodland streams well repays examination. Manure heaps and garden soil also prove prolific. One or two worms were found a few feet below Edale Cross, which is a fairly good elevation, though I have found species a thousand feet higher on Skiddaw and Ben Lomond. I should be glad if collectors would enable me to complete the list. Special search should be made for the *Dendrobæna* found in the decayed trunks of trees—either such as are lying on the soil, or the stumps which are allowed to rot away in the woods after the trees have been felled. The white worms need collecting at different seasons of the year.

1. *Lumbricus herculeus*, (Savigny). On the lawn at Park Hall, Hayfield, 2nd September 1902.

2. *Lumbricus rubellus*, Hoffmeister. In vegetable mould, Park Hall gardens.

3. *Allolobophora profuga*, Rosa. A steel-blue worm with yellow tail. Park Hall.

4. *Allolobophora fœtida*, (Savigny). The Brandling; in manure heaps, Park Hall.

5. *Allolobophora subrubicunda*, Eisen. Park Hall, Kinder Bottom, and by side of a little stream near Edale Cross.

6. *Allolobophora chlorotica*, (Savigny). This worm is very variable, and in addition to the type one or two varieties occurred at Park Hall and Kinder Bottom.

7. *Allolobophora caliginosa*, (Savigny). Frequent in the mould under trees at Park Hall.

8. *Allolobophora terrestris*, (Savigny). The largest species, often confused with No. 1. Same locality.

9. *Allolobophora rosea*, (Savigny). Not at present known to be common. Park Hall.

10. *Allolobophora (Dendrobæna) bæckii*, (Eisen). Three or four specimens found in decaying trunks at Park Hall, where I believe one other species at least occurs.

11. *Allurus tetrædrus*, (Savigny). In the stream formed by Kinder Downfall, by the farms at the bottom of the valley.

12. *Fridericia magna*, Friend. One specimen found with No. 5 below Edale Cross. This worm has hitherto been found by me only twice before, viz., first at Cockermouth and later at Sutton Coldfield. It frequents roots of tufts of grass by the side of streams.

13. *Enchytræus parvulus*, Friend. The aster worm, found in vegetable mould under Kinder Low.

14. *Enchytræus* sp. A very common white worm found in manure with the Brandling at Park Hall, specimens of which I have not been able to examine for final identification. The list is not despicable as a first attempt.



THE HULL MEETING.

THE 41st Annual Meeting of the Yorkshire Naturalists' Union was held at Hull on Wednesday, 10th December, and will long be remembered by the many members who attended.

The forenoon was spent at Hessle and along the foreshore towards Hull. The geologists, under the guidance of Mr. J. W. Stather, F.G.S., visited the chalk quarries, and also a very fine section in the pre-Glacial gravels at Hessle, which on a former occasion yielded remains of Rhinoceros, Elephas, Deer, and Horse. The remainder of the party walked along the West Dock Reservation, a favourite collecting-ground for aliens of many descriptions, under the leadership of Mr. C. Waterfall.

Those who had not an opportunity of calling at Hessle went straight to the Municipal Museum, where several special exhibits had been arranged for the benefit of the members. These included the Union's collection of geological photographs, prints issued

by the British Association Geological Photographs' Committee, boulders collected by the members of the East Riding Boulder Committee, local natural history and geological photographs by Messrs. W. S. Parrish, J. Hollingworth, A. Assert, and C. W. Mason. Messrs. Backhouse exhibited models of fungi, and Messrs. A. Brown and Sons had various specimens which they have got together in connection with the recent revival in nature study.

The sectional meetings having been held, the General Committee met in the Literary and Philosophical Society's Hall, behind the Museum, where the usual business was carried on, and the usual discussion on the balance-sheet took place. It was pointed out that, were the debt of the Union disposed of, it would not be a difficult matter to carry on its work with its present income, and it is to be hoped that the one or two handsome offers made at the meeting will be followed up from other individuals and societies. Probably at no previous meeting have so many changes taken place in the constitution of the Union; it is to be hoped that these may prove beneficial. Messrs. W. D. Roebuck and E. Hawkesworth, having resigned the positions they occupied, the following officers for 1903 were elected:—President, Mr. W. D. Roebuck, F.L.S.; Treasurer, Mr. J. H. Howarth, F.G.S., Somerley, Halifax; Editors, Messrs. T. W. Woodhead, F.L.S., and T. Sheppard, F.G.S.; Secretary, Mr. T. Sheppard, the Museum, Hull. Divisional Secretaries were also appointed.

Before the presidential address was delivered an interesting ceremony took place in the presence of members from all parts of the county. This was a testimonial to Mr. Roebuck, in recognition of his valuable services as Editor and Secretary. The presentation was made by Mr. G. T. Porritt, F.L.S., F.E.S., and took the form of a beautiful illuminated address in book form and clock and bronzes. There is also a substantial balance to the credit of the Testimonial Fund. Mr. Porritt then presented Mr. Hawkesworth with a handsome silver cigar case, in recognition of his services as Joint Secretary in recent years.

At 7.15 p.m. the chair was taken by the Sheriff of Hull (Mr. Victor Dumoulin), who gave a cordial welcome to the visitors. After certain formal business, Mr. P. F. Kendall, F.G.S., read his address, entitled 'Problems in the Distribution of Animals and Plants.' Votes of thanks were then passed to the President, Sheriff, the local Societies, and others, which were suitably acknowledged.

From 8.30 to 10 p.m. a *conversazione* was held in the Museum by invitation of the Hull Scientific and Field Naturalists' Club and Hull Geological Society. The members had thus an opportunity of seeing the collections as re-arranged. When the Union visited Hull in 1889 the Museum was under the control of the Hull Literary and Philosophical Society, but has recently been handed over to the town, and in June last was opened to the public. Under the new management more regard is paid to *local* natural history, geology, and antiquities. For a comparison of the Museum under the previous arrangement and at present, references should be made to the description of the collections on the programmes on the two Hull Meetings. A pleasant evening was passed in the Museum by about 250 members and friends, and refreshments were provided.

Several geologists stayed overnight, and on Thursday morning examined the sections now being exposed at Kelsey Hill, in Holderness, under the guidance of Mr. Stather, President of the Hull Geological Society, who reports that a numerous party of members and associates, including Messrs. P. F. Kendall, F.G.S., J. H. Howarth, F.G.S., W. L. Carter, M.A., F.G.S., E. Hawkesworth, and J. Farrar, F.L.S., visited Burstwick and Kelsey Hill, in central Holderness, to examine the glacial gravels which, in the form of low hills, typically occur there. Arriving at Kelsey Hill, it was seen that on the eastern flank of the hill an extensive new quarry had been opened, exposing a continuous section at least 400 yards long, varying from 10 feet to 30 feet in height. The beds consisted of fossiliferous gravel, covered irregularly by boulder clay. From the gravel shells were freely obtained, including numerous specimens of *Cyrena fluminalis*. The disposition of the boulder clay with regard to the underlying gravel was also remarkably clear and significant.

The Burstwick Gravel Pit, famous for its extensive natural collection of erratics, was also visited. Several examples of Scandinavian rocks were recognised, and others from the Cheviots and the South of Scotland. Details of these will probably appear in the Boulder Report.

The Annual Meeting next year will be held at Sheffield by invitation of the Sheffield Naturalists' Society.

FUNGI.

Addition to the Fungus Flora of Mulgrave.—*Clavaria flaccida* Fr.—C. CROSSLAND, Halifax, 11th December 1902.

Naturalist,

BOOK NOTICES AND REVIEWS.

Martin Lister, M.D., F.R.S., by **Rd. W. Goulding, Louth.** Architectural and Archæological Society of the Counties of Lincoln and Nottingham. **Report** for 1900. Reprint, 8vo., pp. 42.

Here, indeed lies 'good stuff in little room.' Mr. Goulding has done a real service to Natural Science by his masterly memoir of one of Lincoln and Yorks' most justly venerated pioneers in the study of the Fields. This packed brochure makes delightful reading by virtue not only of its author's skilled style—pen and way of using it, both—but in the copious extracts from Dr. Lister's neat and naïve Correspondence about 'simpling' and 'snailing.'

This affords a worthy, and, for its compass a fully-lined etching—a graving that preserves for us, with the true art that conceals the machinery, a picture of the personality of one of those (rare) men with the true scientific flair, who make us marvel 'how in the world' they accomplish so much and so accurately with such few advantages and poor tools! The Darwin of his Day, Martin Lister laid the un-overtured foundation of both zoological and botanical columns of classification. For a pre-Linnean (writing down his observations before the binomial System had birth in a book), he was, indeed, as Mr. Wallis Kew (quoted) says:—'One of the most notable zoologists this country has ever produced.' Now, how was this? He recognised that *the truth*—the *facts* about Nature in all departments of research must precede all Inference and Deduction: all fanciful speculation is 'vain.' I do not know when I have had the pleasure to read such an entertaining, informative *multum-in-parvo*! Even on the Philologic side there is a savoury smack in most of the old-time words and phrases used by Lister and his letter-writers. 'I will compliment the Royal Society with your [Thoresby's] correspondence'—how fine the flattery!—and again, 'I went out a simpling,'—and yet again, 'I have only one left [a Pill!] and am very nice to use it lest I should have none when I have greater occasion'—'a competent state of health'—and many more, for which who wish a Treat must go to the truffled dish themselves. I have only indicated some of its salient constituents.

Yet room for a sprig of balm—sweet herb of feeling, must be found. One of Dr. Lister's love-letters to his wife, beginning 'My deare Hart' is as redolent of hearty affection as a sachet of woodruffe in the linen chest is sweet after long years. 'My poor Deer Hart, be merry, make mad of thy selfe & barnes,

I shall like home twice as well at my returne, and I hope I shall be more healthfull for it. . . . I prithee again be merry . . . for I doe it to gain my health and ease my spirits, overtired with my calling and thoughts.' . . . For Mistress Anne Lister at her house in Lendall street in Yorke. What a *gout* we have here!—'overtired' with his—'thoughts.' Lister lived many years longer than this wife, marrying a second time and dying in 'February, 1711-12,' but in his Will he directed that he should be buried in the grave of his first wife at Clapham in Surrey. He was.

The Orchidaceous genus *Listera*—of which two species grow in Yorkshire, was named after him; likewise the specific name of a Philippine land-snail of the genus *Obba*, allied to *Helix*; and even (as Mr. W. D. Roebuck has pointed out to me) conferred upon a British freshwater shell—*Paludina listeri*—now *Vivipara contecta*.

In all, this is a memoir that confers upon Mr. Goulding the distinction due to all thorough and modest work, although one can read through the lines the real pleasure given its author 'by the way'—the dark and dusty *fallentis semita vitæ* of old tome and holograph—in a longer Journey than that of Lister's to Paris thirteen years before his death.—F. A. L.



The Report of the Manchester Museum, Owens College, for 1901-2, has just been issued, and contains particulars of the work accomplished during the year. Many important additions have been made to the collections. In common with most provincial museums, the want of funds is keenly felt. The income from all sources was £2,704, of which £108 was spent in purchasing specimens. The Manchester Museum is an exceedingly successful one, and deserves better financial support.



'Brown's Pocket Map to illustrate the Geology and Flora of the East Riding,' is a neat production in five colours. It can be obtained from Messrs. A. Brown & Sons, Savile Street, Hull, for 4d., or, mounted on linen, 8d. It is reproduced from Robinson's Flora of the East Riding.



Hull Museum Publications, No. 9, is the first of a 'Quarterly Record of Additions' which the Museum is publishing. It deals principally with antiquities (several of which are figured), though some important gifts of geological and natural history specimens are announced. 'Remains of *Ichthyosaurus thyrospondylus* Phillips from the Kimeridge Clay of East Yorkshire' is the title of Publication No. 10, and contains a detailed and illustrated account of the discovery recently made at Speeton, recorded in these pages by Mr. J. W. Stather, F.G.S. The pamphlet also contains a paper on the 'Educational Advantages of a Museum,' and several items under 'Museum Notes and News.' Publication No. 11 is the second quarterly 'Record of Additions.' These publications are sold at one penny each.

'The Flora of the East Riding' has, by arrangement with the publishers, been issued to the members of the Hull Scientific and Field Naturalists' Club as Vol. 2 of the Club's 'Transactions' (for 1902).

'Clouds and Weather Signs' is the title of a beautifully-illustrated pamphlet of 32 pp., by Commander D. Wilson-Barker, recently reprinted from *Knowledge* and sold at one shilling.

The Commons' and Footpaths' Preservation Society is accomplishing great work in the interests of field naturalists, judging from their 'Report of Proceedings during 1899-1901,' just issued. The Society has brought its influence to bear in connection with certain Yorkshire Water Bills, etc., with good effect.

'The Diatomaceæ of the Hull District' is the title of a work published by Messrs. Wesley & Sons, Essex Street, Strand, at 4s. 6d. It has been written by Messrs. F. W. Mills, F.R.M.S., and R. H. Philip, and is illustrated by drawings of about six hundred species. The pamphlet is reprinted from the 'Transactions of the Hull Scientific and Field Naturalists' Club.'

The Bradford Public Free Libraries are to be congratulated on the production of a 'Class List of Books in the Reference Library on Natural Science.' The various subjects are classified, and, in addition, the list contains an index of subjects and an index of authors. This is the fourth of a series of Class Lists, and the example set by Bradford might well be followed by the Library Committees at other places.

The summer issue of the 'Notts and Derbyshire Naturalists' Quarterly' (formerly the 'Derbyshire Naturalists' Quarterly') (24 pp., 6d.) is to hand. It contains papers on some pre-historic remains in Cornwall, 'The Ancestors of the Horse,' 'How to Choose a Microscope,' etc., and also reprints articles from the *Zoologist* and other sources. It is a pity that more matter does not appear relating to the two counties named on the title of the publication, and surely a few local notes suitable for publication might have been found to fill the last page, which is left blank.

Messrs. W. Lower Carter and W. Cash are to be congratulated on the appearance of the 'Proceedings of the Yorkshire Geological and Polytechnic Society for 1902,' which is largely devoted to papers bearing on the Carboniferous rocks. Mr. Robert Kidston's 'second paper,' dealing with 'The Flora of the Carboniferous Period,' should be particularly serviceable to those interested in the Flora of the county at that remote time, and the numerous beautiful plates will doubtless be appreciated by collectors of coal-measure fossils. A specimen of *Sigillaria* on Plate LIX. shows some of the difficulties in identifying species:—'The upper portion of this specimen shows the *Sigillaria Brardii* Brongt. . . . and the lower part *Sigillaria denudata* Göppert . . . in organic union. The intermediate portion is the *Sigillaria rhomboidea* Brongt. Quite a large number of the specimens figured are Yorkshire specimens, collected by Mr. W. Hemingway. Dr. Wheelton Hind furnishes an elaborate description of the Carboniferous Rocks of the Pennine system, with lists of fossils, comparative tables, etc.; and Mr. E. D. Wellburn follows with notes 'On the Fish Fauna of the Pendleside Limestones,' and 'On the Genus *Coelacanthus* as found in the Yorkshire Coal Measures,' the latter being accompanied by a restoration of *Coelacanthus*. Other papers are 'Ingleborough, Part II.,' by Prof. T. McKenny Hughes; 'The Circulation of Salt and its bearing on Geological Problems,' by W. Ackroyd; 'A Striated Surface near Sandsend,' by Mr. J. W. Stather; and 'Notes on the Igneous Rocks of the English Lake District,' by Mr. Alf. Harker.

FIELD NOTES.

MAMMALS.

Otter near Clapham.—During May last a young dog Otter (*Lutra lutra*) was trapped by a keeper near Crina Bottom Farm. These animals are now fairly numerous along the secluded reaches of the Wenning and its tributary streams.—J. WALLING HANDBY, Austwick, 11th November 1902.

Albino Rabbit near Horncastle.—An albino wild Rabbit (*Lepus cuniculus*) has recently been seen near here, in the parish of Fulletby, near Horncastle, in a warren. Black wild Rabbits are by no means uncommon. I have one on my own ground at the present time, but a white variety is very uncommon in my own experience and that of many others.—J. CONWAY WALTER, Langton Rectory, Horncastle, 13th September 1902.

Otters in North Lincolnshire.—Two Otters (*Lutra lutra*) have recently been noticed at Barrow Haven, North Lincolnshire. One has already been captured, and is 'preserved at the inn.'—T. S.

Badgers at Sapperton, etc., Linc. S.—There are at the present time some Badgers (*Meles meles*) in a small plantation on Mr. H. M. Foster's farm at Sapperton, Div. 15. My brother-in-law tells me that there have been Badgers in that plantation for many years.

A Badger was caught last spring in a trap which a keeper had set for vermin, on Mr. Grayson's farm at Lenton, Div. 15.—S. C. STOW, Court Leys, Brandon, Grantham, 20th September 1902.

Cottingham Churchwardens' Accounts.—Mr. F. E. Johnson, F.C.S., has recently been examining the Churchwardens' Accounts at Cottingham, near Hull, and has kindly supplied us with the following entries relating to 'vermin':—

					s.	d.
1660.	Item.	To Christopher Wilson for a fox head	...	...	1	0
		(This individual continues to catch foxes.)				
	Item.	For getting Moales in the Ings and Common at the rate of 2d. dozen..	...	...	5	0
		(This entry occurs year after year.)				
1664.	Item.	Paid for fox head	...	...	1	0
	„	Paid to Daniel Norwood for seven fowmards' heads	...	...	2	4
	„	Paid to Peter Newlove and Adam Smallwood for 5 badgers' and 10 fowmards' heads	...	...	6	0
	„	Paid to William Ellerton for 3 fowmards' heads	...	...	1	0
	„	Paid to Thomas Wilson for 8 fowmards' heads	...	...	2	8
	„	Paid to Thomas Dobbee for badger's head	...	...	0	6

The above is a sample of the yearly entries, and Mr. Johnson points out that there is a remarkable similarity in payments over two centuries.

Some idea of the value of money at the time may be gathered from the fact that 6s. was paid for a month's labour on the common lands of the church.

There is mention made of 'greyheads' in the accounts; query, do these refer to badgers?

A curious point is that after the extermination of 'fowmards' and badgers, the payments for vermin are entirely on account of sparrows. The reason for this is perhaps obvious.

MAMMALS and BIRDS.

Gamekeeper's Hoard at Kirk Smeaton. In the 'Naturalist' for October 1901 was recorded a list of the 'vermin' suspended on the branch of a tree at Kirk Smeaton, noticed in the preceding June. On revisiting the place recently the size of the hoard had considerably increased. A few of last year's stock still remained, though many had fallen to the ground. This year the collection was as follows:—48 Stoats (*Putorius ermineus*) and Weasels (*P. vulgaris*), 6 Sparrow-Hawks (*Accipiter nisus*), 2 Jays (*Garrulus glandarius*), and 21 Magpies (*Pica pica*), a total of 77. The Hawks included a fine female, killed a few days previously, and a 'Tom-Hawk,' as the small male is called.—T. S.



BIRDS.

Black Kite near Whitby.—Mr. J. A. Wilson, Baxtergate, informs me that a Black Kite (*Milvus migrans*) has been shot at Mulgrave, and is now in his hands for preservation.—THOS. STEPHENSON, 1, Pier Lane, Whitby, Yorks., 22nd October, 1902.

Fork-tailed Petrel at Grimsby.—During one of the winter gales a specimen of the Fork-tailed Petrel (*Oceanodroma leucorhoa*) was blown ashore and picked up dead in a back-yard. The bird has been set up and presented to the Grimsby Museum.—A. SMITH, Grimsby Nat. Soc., 2nd September, 1902.

Crossbill at Horton-in-Ribblesdale.—On 6th July 1901, an adult female Crossbill (*Loxia curvirostra*) was captured alive by a workman at the Foredale Quarries. Upon examination a cicatrised wound showed that the left scapula had been broken (probably by a falling stone during the course of blasting operations). Near by the place of capture a small grove of coniferous trees studs the hillside. The specimen (mounted) is now in the possession of Mr. R. Batty, an Austwick resident.—J. WALLING HANDBY, Austwick, 11th November 1902.



FISHES.

Sticklebacks in Lincolnshire.—Fulfilling a promise made at the Doncaster meeting of the Unions I publish Arthur Young's note in full. See 'Lincolnshire Agriculture,' 1799, p. 259:—'Sticklebacks in the East and West Fens [are] so numerous, that a man has made 4s. a day by selling them at a halfpenny a bushel. They come from the sea into Boston haven also, and the use of them, whenever [they are] to be had, [is] immensely beneficial. They are the most powerful of all manures.'

The species of *Gasterosteus* in the fen drains inland are the Ten-spined (*G. pungitius*) and the Three-spined (*G. aculeatus*). We have them both here, and my son and nieces had no difficulty in taking a score of each species in one drain on the 29th August last. The Fifteen-spined Stickleback (*G. spinachia*) is the marine species which frequents Boston haven.—E. ADRIAN WOODRUFFE PEACOCK, Cadney, Brigg, 8th September 1902.



CRUSTACEANS.

Crayfish in Nottinghamshire.—In *The Naturalist* for February 1898, page 36, I stated that I had no knowledge of the Crayfish as a Nottinghamshire crustacean. During the past summer, however, I have received numerous specimens from Mansfield, where I am informed that it occurs fairly commonly in the river Maun and the dams connected with it.—J. W. CARR, University College, Nottingham, 3rd December 1902.

SPIDERS.

***Zora maculata* and *Oonops pulcher* near Grimsby.**—

Zora maculata is an addition to the Lincolnshire list of spiders. I took it at Bradley (Div. 4) in March 1902.

Whilst visiting Newsham Woods (Div. 3) this summer, Mr. Parker and I searched for spiders, and from rubbish in a crevice of a wooden hut we took a single specimen of *Oonops pulcher*. This makes the third parish in which this rare spider occurs in the Grimsby district.—ARTHUR SMITH, 5, Cavendish Street, Grimsby, 10th September 1902.

BEETLES.

***Cionus scrophulariæ* in North Lancashire.**—Thanks to Mr. Wallis Kew's paper (ante 149-55), I have seen the cocoons of *Cionus scrophulariæ* in fair quantity this year, some very fine on *Scrophularia nodosa* between Water Yeat and Arklid, at foot of Coniston Lake. They occur also between Nibthwaite and Lowick, and in various lanes about Ulverston.—S. L. PETTY, Ulverston, 4th October 1902.

***Pogonus luridipennis* in Lincolnshire.**—On 4th September 1902 my wife brought home some 'Samphire' (*Salicornia herbacea*) gathered at Saltfleet. On searching amongst it I found three beetles, which I sent to the Rev. A. Thornley, who submitted a specimen to Canon Fowler, and writes me that they 'have turned out to be (as he suspected) one of the very rarest of British beetles, viz., *Pogonus luridipennis*. The only locality where it is taken at present is, he believes, Sheerness. The specimens from this locality are, however, much larger, though coloured exactly the same, and in all particulars quite the same.'

A specimen was also found among growing 'Samphire' at Humberstone on 18th September, when a few members of the Louth and Grimsby Societies, with the Rev. E. A. W. Peacock, visited that place.—C. S. CARTER, 8, Bridge Street, Louth, 6th November 1902.

GEOLOGY.

A Lincolnshire Boring.—Mr. Henry Preston, F.G.S., has published particulars of an important boring at Caythorpe, which, after passing through the Northampton sands, penetrated 199 feet of Upper Lias, 19 feet of Marlstone, and entered the Middle Liassic Clays. An examination of the shallow wells in the Lincolnshire Limestone showed that the rock has a well-defined dip to the west, down the face of the escarpment, as though it had settled down upon the eroded surface of the Upper Lias. In his opinion this settlement is probably the cause of a continuous spring flowing from the junction, and it has given rise to an under-estimate of the thickness of the beds of the Upper Lias. Mr. Preston is doing good work in collecting details of Lincolnshire borings. Would that someone would continue the work of recording Lincolnshire erratics, so ably started a few years ago.

BOOK NOTICE.

Rural Studies Series, No. 1, 'Thoroughbreds and their Grass-Land,' by the Rev. E. Adrian Woodruffe Peacock, L.Th., F.L.S., F.G.S., M.C.S., Vicar of Cadney, Brigg, Soil, Grass, and Game Specialist, is the title of a pamphlet recently published by Goulding & Son, Louth. The author's desire 'is to call attention to the repeated and serious losses which arise from want of observation and proper care in the management of pasture and meadow-land used for horses,' and to name such remedies as his experience suggests. The price of two shillings, however, seems rather high for a pamphlet of 16 pp.

NORTHERN NOTES AND NEWS.

The Manchester Scientific Societies are considering the advisability of having a central building in which their meetings may be held.

The report of the Botanical Exchange Club for 1901 includes several new records for Lancashire, notably *Helleborus viridis*, *H. fœtidus*, *Scirpus caricis*, and *Carex teretiuscula*.

The Annual Report of the Liverpool Geological Association just received consists of a 16 pp. pamphlet, containing a list of the 41 members, abstract of proceedings, etc.

'Blackpool and the Subsoil' is the title of a paper recently read to the Manchester Geological Society by Mr. Joseph Dickinson, F.G.S. The subsoil, however, is but briefly referred to.

At a recent meeting of the Manchester Geological Society Mr. Gerrard exhibited several fragments of insect wings from the Barnsley coal seam at Monckton Main Colliery. The specimens were thought to be 'fragments of a *Borrea*, one of the *Platypterids*.'

The Hull School Board Head Teachers' Association has issued a syllabus of twenty lectures, to be delivered to scholars visiting the Hull Museum during school hours. The lectures are delivered by the curator, Mr. T. Sheppard, F.G.S., and are illustrated by specimens in the Museum.

Mr. Geo. Sills has an interesting note on 'The Parentage of Sir Isaac Newton' in *Lincolnshire Notes and Queries* for October. He shows that the 'History of Lincolnshire' (1836) is in error on the point, and that Sir Isaac was born at Woolsthorpe, and received his early education at Shillington, three miles distant.

An appreciative notice of the late Thomas Comber, of Neston, Cheshire, accompanied by a portrait, appears in the November *Journal of Botany*. It will be remembered that so long ago as 1858 he published a list of the *Diatomaceæ* in the neighbourhood of Liverpool, which served as a model for similar lists which subsequently appeared.

In the same journal Mr. G. C. Druce gives particulars of some new botanical records in Cumberland, made whilst spending a week at Keswick last August. These occur in a short note headed 'Cumberland Plants.'

Mr. E. A. Newell Arber, M.A., F.G.S., gave the results of his recent researches on the fossil flora of the Cumberland Coalfield to the Geological Society of London on 5th November last. From the evidence obtained by a careful examination of the plant remains he has been enabled to give a more detailed classification of the rocks of the area than was previously possible.

During September 'tons upon tons' of fresh small fish have been taken to the destructor at Hull, having no detriment but small size. The same thing has occurred in previous years. It seems a great pity that fish of so small a size should be brought into the market. The skippers surely know by now that it is useless to bring them to port. In view of the future of the fishing industry in the North Sea, something should certainly be done to prevent this wholesale capture and waste of undersized fish.

The Rev. J. H. Mackie, M.A., who so ably assisted the members of the Yorkshire Naturalists' Union on their excursion at Sedbergh in August, has left Sedbergh after twenty years' residence there, for Filton Rectory, near Bristol. It was noticed that the inhabitants of Sedbergh were subscribing to a testimonial to the reverend gentleman, and the members of the Union unanimously decided to follow suit. The result was that Mr. Mackie has been presented with a set of the geological maps and memoirs, etc., of the district around Filton.

The birds in the Blackburn Museum have recently been labelled by Mr. R. J. Howard, who is also preparing a catalogue of them.

We understand that the Nobel Prize of £3,000 for researches in malaria will be a personal one to Major Ross, of the Liverpool School of Tropical Medicine.

'An Account of the Work of the Southport Observatory' is given in the 'Fifth Report of the Southport Society of Natural Science,' by F. L. Halliwell.

At a recent meeting of the Entomological Society, Mr. R. Louth exhibited four specimens of a large form of *Cupido minima* (*Lycena minima*) from Cumberland.

We would draw attention to the advertisement on the cover offering Lees's 'Flora of West Yorkshire' for 5s., or 5s. 6d. post free. This should put this valuable work within the reach of all botanists.

Mr. J. W. Stather, F.G.S., reprints his paper on 'A Striated Surface at Sandsend' from the 'Proceedings of the Yorkshire Geological Society, 1902.' Previously recorded striated rock surfaces on the Yorkshire coast are at Filey and Robin Hood's Bay.

In support of Nature study, Lord Herries presided over a meeting of about 600 teachers from East Yorkshire, at Beverley, in November. Prof. Miall delivered an address, and a committee was formed to consider the best plan for encouraging Nature study in schools.

Dr. Tempest Anderson, of York, in conjunction with Dr. J. S. Flett, has issued a 'Preliminary Report on the Recent Eruption of the Soufrière in St. Vincent, and a Visit to Mont Pelée, in Martinique.' (Proc. Royal Soc., Vol. 70, pp. 423-445.) It is illustrated by several fine photographs.

'The Transactions of the Entomological Society of London for 1902' have been issued to the members, from which we gather that at the Society's meeting on 16th April last Mr. Willoughby Gardner exhibited *Calioxys mandibularis* Nyl. from the Cheshire coast, a species new to Britain.

In view of Smith's work in East Yorkshire, Yorkshire geologists will be interested in a paper by Dr. Henry Woodward, F.R.S., on 'William Smith, LL.D., "Father of English Geology,"' printed in the 'Proceedings of the Bath Natural History and Antiquarian Field Club,' Vol. 10, Part 1, 1902. The paper has three illustrations.

There is a valuable paper on the 'Transportation of Glacial Boulders from the Lake District to the North-West Coast' in the 'Proceedings of the Birmingham Natural History and Philosophical Society,' Vol. 9, Part 2. This is illustrated by a plan and photographs, and is by Mr. H. G. Mantle, F.G.S.

The Rev. J. C. Mitchell contributes a paper on the 'Results of Meteorological Observations taken in Chester during 1901,' in the 31st Annual Report of the 'Chester Society of Natural Science,' etc., recently issued. The same report contains some interesting observations on the 'Flood at Glyn,' by Mr. F. E. Rooper.

'Calcrete' is the term applied by Mr. G. W. Lamplugh (*Geological Magazine*, Dec. 1902, p. 575) to hard masses in sand and gravel beds which have been cemented sporadically by solution and redistribution of lime through the agency of infiltrating waters. To those studying glacial and post-glacial geology the term may prove useful. Mr. Lamplugh also suggests 'silcrete' for sporadic masses in loose material (e.g., 'greywethers'), and 'ferricrete' when the binding substance is an iron oxide.

NOTES AND COMMENTS.

A LOST BRITISH GOOSE.

At the Leeds Meeting of the British Association in 1858 Strickland read a paper on the 'Long-billed Carr-lag Goose,' in which he stated: 'Before the beginning of this [nineteenth] century, when the carrs of Yorkshire were the resort of countless multitudes and numerous species of wild fowl, giving employment to numbers of decoy-men, fowlers, and carr-men, I understand it was stated there were two species of Geese frequenting *and breeding* in the carrs, known by these people by the name of the Grey-lag and Carr-lag. What the Grey-lag was is well known, as, fortunately, that bird retains the name originally given to it by the fowlers. What the Carr-lag was it is probably impossible now to demonstrate; but I have every reason to think it was this Long-billed Goose, a bird that resided and bred in the carrs along with the Grey-lag, and, like that, is no longer to be found in these districts, and, as far as I know, is not at present to be found in any part of this country, and is now one of our scarcest British birds, or almost a lost species. The bird is distinguished from the Bean-Goose by its *entirely different habits*, and, as before stated, by its long bill. It may be thought by some that this difference of length may be the result of age; but this cannot be maintained, as its bill is small and weak, *suited to its aquatic habits*, very unlike the short bill of the Bean-Goose, suited to its granivorous and herbivorous feeding.'

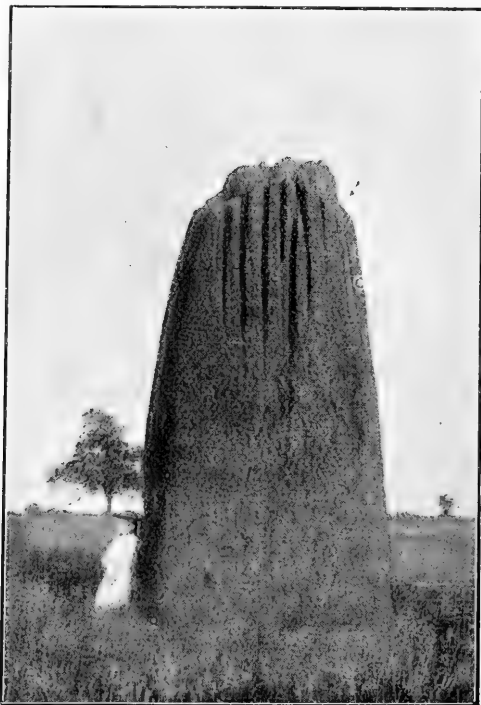
'FOUND AGAIN.'

Strickland's record appears to have been almost overlooked by ornithologists for another half century, until Mr. F. Coburn, in recently examining a specimen he secured at St. Abb's Head, in 1896, found that it differed materially from *Anser segetum*, principally from its having a long neck and swan-like feet. After a very careful inquiry he is led to the conclusion that the specimen he has secured is no other than the long-lost *Anser paludosus* described by Strickland. A full account of this discovery, apparently the first complete description of the species, appeared in the December *Zoologist*.

As the bird seems to have been lost to the ornithological world for a century, the question naturally arises as to where it has survived since? It is to be hoped that collectors having old stuffed specimens will carefully examine them in the hope of establishing an authentic Yorkshire Long-billed Carr-lag Goose.

THE DEVIL'S ARROWS.

The Devil's Arrows, near Boroughbridge, are amongst the most striking of the many relics of pre-historic man preserved in Yorkshire. At present three large monoliths are standing, the weights of which are estimated to be 36 tons, 30 tons, and 30 tons respectively. The northern one is 18 feet high; the others have a height of about $22\frac{1}{2}$ feet each. They stand in a line almost due north and south, the distance between the



The North Arrow.

north and central stones being 129 feet, and between the central and southern stones 360 feet. Formerly there were more stones standing. Leland, about 1538, saw 'four great main stones.' One was pulled down a few years later, and a part of it is preserved in the district. The three standing vary in depth below the surface from $4\frac{1}{2}$ feet to $6\frac{1}{2}$ feet, and the lower portions are roughly squared off. Mr. Alex D. H. Leadman, F.S.A., gives an interesting description of these Arrows in the January

Naturalist,

Antiquary, illustrated by photographs, one of which is here reproduced by the courtesy of the Editor. Mr. Leadman no doubt rightly considers that these stones were erected by the Britons, and were probably connected with the earliest form of worship. They are of Millstone Grit and were most likely procured from Plumpton, eleven miles distant. The upper parts are grooved, not artificially, but 'by the hand of time and the rains of centuries.'

THE BRADFORD MUSEUM,

Mr. Butler Wood, Chief Librarian of the City of Bradford, has presented a report to his Committee on the future of the Cartwright Memorial Hall, which is largely based on the discussion which took place at the Bradford meeting of the Museums Association (see *Naturalist*, September 1902, p. 288). Curators from various museums expressed their opinions as to the best method of utilising the limited space at the disposal of the Committee, and it is only natural that Mr. Wood should accept those recommendations which coincided with his own views, viz., that the Museum should be devoted to Ethnology, Archæology, and Art.

AND NATURAL HISTORY.

Unquestionably the report is correct in the statement that 'the abandonment of the idea of the Natural History scheme would doubtless cause disappointment to many interested in the subject,' and we trust that the scientific men of Bradford will do their utmost to frustrate the attempt to exclude this section, particularly in view of the fact that the Bradford Corporation is already in possession of a goodly number of specimens, presented to and accepted by them to form a nucleus of a Natural History Museum.

As was well pointed out by many of the Curators at the Museums Conference, what could possibly be more valuable to the inhabitants of Bradford than that the collections should be devoted to *local* Geology, Natural History, and Antiquities? Mr. Butler Wood has greatly interested himself in local Antiquities; consequently we find a recommendation to the effect that a section should be devoted to these. It is a pity that he was not similarly interested in Geology and Natural History; but others are, and we hope they will not allow the present opportunity of stating their claims to go by.

BRITISH GEOLOGICAL PHOTOGRAPHS.

Prof. W. W. Watts, the energetic Secretary of the British Association Geological Photographs Committee, has rendered great service to geologists by issuing a selection from the best photographs in the possession of the Committee. The first issue contains twenty-two photographs, each being accompanied by a concise description. The illustration here given, for which we are indebted to the proprietors of *Nature*, is one of



Arco Wood Quarry, near Settle.

these photographs on a reduced scale. It shows Carboniferous Limestone resting unconformably on Ludlow Slates, in Arco Wood Quarry, on the west side of Ribblesdale, about four miles north of Settle, Yorkshire. The photograph was taken by Prof. S. H. Reynolds, and the description is written by Prof. J. E. Marr. The series is also issued as lantern slides, which should be of great service to teachers of geology.

‘FUNGUS FLORA OF YORKSHIRE.’

After eleven successive annual Fungus Forays within the county of Yorkshire, added to records previously and contemporaneously made, it has been considered advisable to summarise the results in the form of an annotated list of known Yorkshire species. The work has been undertaken by Mr. G. Masee, F.L.S., F.R.M.S. (Kew), and Mr. C. Crossland, F.L.S. (Halifax), Hon. Secretary of the Yorkshire Mycological Committee.

‘The Yorkshire Fungus Flora’ will be issued to the members of the Yorkshire Naturalists’ Union as ‘Transactions,’ and the

Naturalist,

first instalment, consisting of 52 pages, with records of 261 species (*Vidularia* to *Myceus*) is ready for distribution. It may be obtained by non-members from the Secretary of the Union, price 1s. 3d. net.

NOTES ON HOLDERNESS BIRDS.

T. PETCH, B.Sc., B.A.,

Hedon, Hull.

ALTHOUGH a complete list of the birds which have occurred in Holderness would be almost a catalogue of all the British species, it would be very misleading to describe the district as a favourable one for ornithological observation. For the study of bird-migration Spurn is unrivalled, and our list has been swollen by the accidental occurrence of rare visitors there, but our resident species are few, and the summer visitors, which land in such large numbers upon the coast, hasten away inland, and seldom remain to breed east of Hull. Thus, in the summer, if we except Spurn and Hornsea Mere, there are few localities in which we can be certain of finding any but the commonest species. In the winter, however, the district is at its best: waders of all kinds frequent the Humber lands, ducks abound on the numerous carrs, and there is always the possibility of flushing a rare bird from even the most unpromising locality. This element of chance constitutes the chief charm of Holderness, and the hope of meeting some species new to the observer stimulates him to tramp abroad in all weathers, and lightens many an otherwise monotonous walk.

Of our summer visitors the warblers form the least represented group. The Whitethroat and the Sedge Warbler are abundant, and the Reed Warbler is common on Hornsea Mere, though apparently absent from our other reed beds, but the Lesser Whitethroat, Blackcap, and Garden Warbler do not nest with us, though the last-named crosses Skirlaugh on its autumn migration. Again, of the Wood Wren, Chiffchaff, and Willow-Wren, we have only the last—the ‘Bank Wren’ of the country boys—making the family at least numerically well represented.

Our chief songsters, then, are the Blackbirds and Thrushes, and when these are in full song there is no lack of melody: indeed, I often think that in Holderness these sing better than elsewhere, and I have frequently heard a snatch of Blackbird

song almost an exact repetition of the 'que j'ai tant, tant, tant, tant, battue' of the Nightingale. This bird has been recorded for Patrington in numbers which could only be paralleled in a southern Nightingale county, but confirmation is wanting. Nightingale recorders should remember two facts, and observe accordingly: the bird does not sing only, or chiefly, at night; it is more often heard during the day, and may then be seen; its red tail is unmistakable.

The Whinchat is observed in large numbers on migration at Aldborough, especially in September, and may be found nesting on drain banks and along the railway, sometimes within six feet of the line. The status of the Stonechat is questionable: it may be seen at Aldborough at any time except during the breeding season, but is never common. Usually, a pair arrives on the cliffs in August and remains through the winter. Another non-breeding visitor is the Wheatear, which is abundant in the Humber district and along the coast in April-May and August-September. I saw a single bird on Spurn, 17th June 1899, but, judging from its behaviour, it had no nest. Mr. J. A. Fisher, however, reports a young bird, scarcely able to fly, at Crossmere Hill, July 1900. The case of the Redstart is similar: it passes Aldborough northward in April and May and returns in September, but it bred at Hedon in 1888. The Pied Flycatcher is another May and September migrant at Aldborough, often overlooked, for the majority seem to be hen birds. I have only seen one cock, which remained several days in May 1899, delayed by the cold weather; when sitting huddled up on the wire fence it might have been mistaken for a House Martin. The Spotted Flycatcher (summer visitor) nests throughout the district, and seems to have developed a preference for ivy-covered trees: it is often common in August on the hedge on the guard bank at Saltend.

The Yellow Wagtail is very common on the Humber lands in April and September, and a few remain to breed there. Two nests were found in the straw sides of lambing pens on Cherry Cob Sands in 1899, but it usually prefers to build under the shelter of a thistle, or in the middle of a cornfield. The Grey Wagtail is a somewhat irregular autumn migrant at Hedon, and the Pied Wagtail is migrant at Aldborough, returning about 1st March. Similarly the Corn Bunting—'Tit Lark'—is migrant throughout Holderness, and the resident Reed Bunting—'Blackcap'—receives considerable additions to its numbers in the summer. In Holderness this bird builds in the lower branches

of hawthorn bushes on the drain banks, often several feet from the ground, and many of those on Hornsea Mere occupy a similar position, but it may be found, as in the Fens, amongst reeds, at Kelsey Hill and Hornsea. There is a well-marked variation, too, in the nest of the Sedge Warbler; the majority are slight structures of bents, lined with horsehair, but many are strongly built of moss and hay, and lined with feathers or reed-heads. In 1899 I found both forms at Kelsey Hill, the former on the fen, and the latter amongst the grass at the top of the cliff.

Of our other summer visitors the Swift is local (Hornsea), young Cuckoos are frequently seen at Aldborough in September, Swallows (Hedon, 18th-20th April), and Sand Martins are common and the House Martin is increasing. In 1900 a pair of House Martins built their nest on a beam in a wagon shed at Thorp Garth, Aldborough. They commenced to build about four feet from the outer wall, but, evidently dissatisfied with their position, moved along the beam towards the entrance, leaving a horizontal line of clay two feet long. The site finally chosen was two feet horizontally and one and a half feet vertically from the top of the entrance, exactly such as a Swallow would choose; the young birds had not left the nest on 3rd September. On 5th September 1897 there were four broods of Swallows at Aldborough, the members of three being scarcely able to fly, and the fourth still in the nest; a single bird was seen at Sproatley, 5th November 1895. I have seen the Woodlark once (Sproatley, 28th April 1900), and heard the Grasshopper Warbler near the same place, 6th May 1897. The Ring Ouzel is seen at Aldborough on migration in April, and a Red-backed Shrike occurred there, 4th May 1898; the latter has bred at Beverley and near Easington, but there is not much hope of its becoming a regular summer migrant when it meets the fate of the last, which were allowed to bring off their brood undisturbed in order that a case might be made of the whole family.

Of our rarer residents, the Goldfinch—'King Harry' or 'Redcap'—nests in ever-diminishing numbers (Sproatley, 1893; Hedon, 1893 and 1894), and is seen in farmyards in the winter; the Bullfinch is very local, nesting chiefly near Burton Constable (shot at Hedon, November 1889, March 1895; Aldborough, 6th January 1899, December 1901); and the Tree Creeper is rarely seen south of that place, though a single bird remained all the summer in 1899 in the plantation on Cherry Cob Sands;

it has been seen in the winter at Hedon and Boreas Hill. The Hawfinch, which is probably only a summer visitor, nested in the Hull General Cemetery in 1885, and was seen at Roos, 3rd June 1899.

My coco-nuts and bones have never attracted any Tits except the Great (Ox-eye) and the Blue (Billy-biter). The Coal Tit is only an accidental visitor; one was seen at Hedon, 24th December 1897, and Mr. W. Kirk took a nest there in 1884. In the winter, small flocks of Long-tailed Tits are occasionally met with (Aldborough, December 1896; Hedon, 27th December 1899), and the Goldcrest, which one naturally associates with Tits, is then common. A large flock of Goldcrests was observed at Aldborough, 20th-22nd April 1899, and what was probably the same flock was recorded at Rowleston, with a note on the probable point of departure of migrants on the Holderness coast, but only two were seen there, about the same date in 1900. The Bearded Tit was recorded for Hornsea Mere in 1901*, but has not yet been seen by local ornithologists, though the record should not remain unconfirmed long, as it seldom travels far from its breeding haunts. It has a very distinctive note, best syllabised as 'ping-ping,' and best imitated on a banjo; the male has an orange beak and a long black moustache. Its flight is undulating, and its long tail seems to hamper it considerably in a moderate breeze.

In the winter, our resident species are reinforced by migrants from the Continent: Larks are especially noticeable, and the Wren and Lesser Redpoll are then far more common than in the summer. Redwings and Fieldfares arrive in large numbers, the latter often remaining till the end of April; occasionally flocks of Snow Buntings, Bramblings (November 1896), and Shore Larks (December 1895) are seen at Aldborough, and the Tree Sparrow is then seen in the stackyards. From October to April the Danish Crow forms a prominent feature of Holderness bird life; we always reckoned his time of arrival as Hull Fair day (11th October), but I saw eight at Flamborough, 9th August 1898. Mr. Fisher reports a single bird at Aldborough, 1st and 4th June 1902. I have looked in vain for the Grey Shrike for many winters.

Holderness is not a game-preserving district, but we have perhaps a more destructive agent than the gamekeeper, for almost every Holderness farmer is a keen sportsman, and any rare or brightly-coloured bird is soon shot. Consequently,

* *The Naturalist*, 1901, p. 230.

Carrion Crows breed unmolested in isolated spinneys or in trees in the hedgerows, and rookeries are common, but the Magpie nests only in one remote corner, and I have not yet seen a Woodpecker or a Jay. As in all estuarine districts, the Kestrel is the common hawk, often nesting in a deserted Carrion Crow's nest; the Sparrow Hawk is scarcer, but may be seen fairly frequently. For many years the Kestrel and the Barn Owl lived with the Jackdaws in Hedon Church tower. The Short-eared Owl—'Woodcock Owl'—is frequently shot in autumn, being flushed from turnips when Partridge shooting, and the Corncrake often shares the same fate. This bird nests late in Holderness, so that the eggs are frequently broken by the reaper in July (Hedon, 23rd July 1895, 8th July 1899; Aldborough, 15th July 1895). The Water Rail is shot late in the year (Kelsey, 15th December 1899; Aldborough, 30th December 1899), and a Spotted Crake was shot at Aldborough, November 1892. The Red-legged Partridge, as far as I have seen, does not occur in Holderness.* At other times the Ring Dove is shot in large numbers without causing any diminution; it is always called the Stock Dove, but the true Stock Dove is very local (Fitling). Similarly the 'Blue Rock' is not *Columba livia*, but an escaped domestic bird. The Turtle Dove has been seen at Aldborough in August and September.

But it is along the shore, amongst the waders and sea birds, that the ornithologist will find most to interest him. In the nesting season we have the Lapwing, Redshank, Ringed Plover, Oystercatcher, Cormorant, and Lesser Tern, though three of these are then found only at Spurn, and the Cormorant's home cannot be permanent. Lapwing and Redshank are abundant, and the latter is certainly increasing, probably because its nest is not as easily found as the Lapwing's and its eggs thus escape the notice of the 'Plover egg' collectors. On Saltend Common the Lapwing's eggs are not laid in any convenient hole: the construction of the nest occupies considerable time, and several are commenced and left unfinished. The grass is first pulled up over a circle four inches in diameter and left round the bare patch till dry; it is then placed round the hole, and the bottom and sides are moulded into a saucer-shaped hollow with its edge slightly raised above the surrounding level. Sometimes bents are placed across, all in one direction, and these, projecting on either side, make the nest much more conspicuous. The Redshank, however, usually makes a bare

* See *The Naturalist*, July 1902, p. 223.

patch in the middle of a tuft of grass which meets over the nest and hides the eggs, and there is no 'run' or path to it; occasionally the nest is lined. The Redshank frequently alights on the ridge of the shed on Saltend, and uses the numerous molehills as posts of observation from which to watch the progress of intruders. The Oystercatcher, numerous on the coast in August and September, and sometimes seen up the river as far as Marfleet, has returned in late years to its former breeding haunts at Spurn, and will, it is hoped, flourish with the Lesser Tern and the Ringed Plover under more efficient protection. The Ringed Plover's nest on Spurn is often lined with small white stones; it is one of the commonest birds on the Humber mudflats at other times of the year, and its well-known whistle, warning all other birds in the vicinity, is a constant annoyance to the ornithologist.

The former monotony of the coast from Hornsea to Withernsea has been somewhat relieved during the last ten years by the presence of a colony of Cormorants on the wreck of the 'Beaconsfield,' which ran ashore at Ringborough in 1887. One mast has been left standing to warn the fishing cobs, and the Cormorants have nested in safety on the cross-trees, there being, fortunately, no means of disturbing them without an expenditure to which even the possession of a local Cormorant's egg could not persuade the most rabid collector. Sixteen have been seen on the vessel at one time (31st August 1900); with a good glass nestlings may be distinguished on the cross-trees, and the young birds are easily identified in August by their white breast and throat. In the winter they return from their fishing grounds on Hornsea Mere or along the coast at sunset, but in August and September practically the whole colony will be found at home shortly after the tide has commenced to flow. Amusing contests for the post of honour on the top of the mast are often witnessed, in which the bird in possession is always compelled to abdicate his position because his opponent attacks him from the rear and glides upwards to alight. This mode of alighting is very characteristic; when a bird approaches the mast at a higher altitude it gradually descends in narrowing circles and rises to its perch on the final curve.

In April and May, before the Golden Plover (4th May 1895), Stint, and Curlew have departed to their breeding grounds, the Common Sandpiper and the Whimbrel arrive in the Humber district. There is no record of the breeding of the Stint in Holderness. I saw a pair in summer plumage at Hornsea

Mere on 21st June 1899; but Stint and Curlew may be seen on the Humber flats all the summer, though the majority gather into large flocks in April, and after a few days' practice in the estuary, leave us till the autumn. What is apparently the smoke of a steamer trails across the Spurn flats many miles away in the teeth of the wind in a manner quite opposed to all the laws of aerostatics; suddenly it bends, vanishes for an instant as the white breasts of its thousands of Stint turn towards the sun, and then reappears to perform the same evolutions, until the observer tires of watching.

The returning tide sets in in July; small parties of Knot (17th July 1899) and Golden Plover (28th July 1894) are then seen at Aldborough, and soon afterwards the Common Sandpiper reappears along our drains, and the Whimbrel along the coast, accompanied by the Turnstone, Godwit, and Stint. Kingfishers are then common on the drains and creeks, and Herons, young birds from inland heronries, are seen in flocks of a dozen on the mud. In recent years the Green Sandpiper has visited us in large numbers in August and September, and several have been brought for identification; they are known on Cherry Cob Sands as 'White Rumps,' the most local bird-name I have yet met with, for I believe its use is restricted to the members of one family. Later, Grey Plover are seen, but they, like the Knot, generally remain in the neighbourhood of Spurn, though a large flock was seen at Bilton, 21st December 1900. Amongst the accidental visitors I have met are the Great Snipe (Cherry Cob Sands, 23rd August 1901), the Grey Phalarope (shot at a horse-pond, Aldborough, November 1894), the Curlew Sandpiper (Saltend, 23rd April 1898), and the Green-shank (Saltend, 15th August 1900).

In the winter, when the Lambwath stream overflows the meadows on either side, the inland sea which extends from Marton almost to Aldborough is a favourite resort of ducks and waders. 'Fleeting' is then assiduously pursued by the local sportsmen, who, crouching on the banks which alone remain to show the farmer the limits of his fields, shoot the duck as they come inland at dusk to feed. Rat-traps, baited with corn and placed at the water's edge, account for many more. Wigeon, Mallard, and Teal form the majority, with sometimes Pochard (December 1899) and Shoveller (December 1901), and occasionally a Goose or Swan. Eleven Swans frequented this locality last winter, and six were shot before January, but I have not been able to trace them. I saw the

remaining five on 6th January, but could not get near them; they appeared to be mutes. Two Brent Geese were shot near the head of Lambwath stream in November 1897. The Wigeon may be heard whistling over Aldborough as late as April. Pochard, Scaup, and Mallard are common on the Humber in the winter, and flocks of Scoter may be seen off the coast from August. Of our resident ducks, the Sheldrake breeds on Spurn, and is reported to have nested in haystacks on Sunk Island; the Common Pochard maintains a well-known colony on Hornsea Mere, and the Mallard nests on the banks of ponds, etc., throughout the district. Teal and Shoveller are often met at the end of July, and the latter, as in other districts, is increasing.

Occasionally Merganser are found in the broads on Cherry Cob Sands (December 1899), and the same locality provided another Holderness record of the Stormy Petrel in November 1893, when one was shot while flying down a ditch. The Little Grebe was formerly common on these ponds and sufficiently numerous inland to acquire a local name, but of late years it has been much rarer, though a flourishing colony has recently been established near Hedon. I have never found the eggs in March; the usual time is about the first week in May, and in 1899, when Mr. Richardson, of Sands House, kept a sharp look-out for it, the first eggs found there hatched off on 16th July. The Crested Grebe still manages to exist on Hornsea Mere, but, like the Lesser Tern, the colony is too well known to flourish. The Common and Arctic Terns do not breed with us but pass along the coast on migration, and the Black Tern, which formerly bred in Norfolk and is now a regular spring visitor to that county, may often be seen at Spurn.

Last year (1901) a Blackbird with a white tail, except for a few centre feathers, frequented Thorngumbald (August), and another with white tail coverts and white feathers in wings and back was seen at West Newton (10th August); white Sparrows are frequently seen at Newton Garth, near Paull. Mr. J. A. Fisher, of Aldborough, has several abnormally-coloured Larks which he has shot there. I have seen two clutches of Blackbirds' eggs in which all the eggs were a uniform blue; in one case the nest was very slight, practically only a platform of hay. A Lapwing's egg, with a bluish-white ground, and freckled with small purple and gray spots, was found floating in a pool on Saltend, 13th April 1898; and a Whitethroat's egg in my possession, taken in 1889 from a nest in which all the other eggs were normal, measures .5 by .3 inches.

With few exceptions, the foregoing notes relate to that part of Holderness which lies to the south of the Hull and Hornsea line, and merely place on record observations made chiefly during vacation visits extending over a period of ten years. No attempt has been made to include all the records relating to this area, nor would this be desirable, even if space permitted, since the 'Birds of Yorkshire,' shortly to be published by the Yorkshire Naturalists' Union, will deal exhaustively with the enormous mass of literature which has accumulated through the labours of Cordeaux and others. My desire has been rather to supplement the observations made at Spurn by a brief account of the bird life of its hinterland.

UNDESCRIBED BRITISH VARIETY OF *CISTUS*.

JOSEPH FRY PICKARD,

Leeds.

'The gilded *Cistus* of the sun-kissed rocks,
The pale Primrose's gayer heir 'tis said,
That, with rose-petal cheeks and golden locks,
Looks in July to cheat the heart and head
With thoughts of bygone springs and bleating flocks;
And which when o'er we know the summer fled.'

WHEN naturalists are on the field path even versified botany is true to fact—being the result of observation—is spoil for their cranial vascula. The 'Rock-Rose,' for its gay frailty, somehow always holds the eye on down or roadside bank, from its first crumpled and creased petal to the last expiring star of autumn.'

I adopt the foregoing from my friend, Mr. F. Arnold Lees, to whom and to Mr. Arthur Bennett I am indebted for information, and by whom I am encouraged to add to the British Flora what seems to be an as well-marked as it is a striking variety of the Rock-Rose, and one of which no English handbook or manual gives any description. Mr. Bennett informs me that he has looked into some twenty Continental Floras and finds no mention of my red-spotted form, except in the 1890 'Flora Schleswig Holstein' of Dr. Prah. The vars. given in our British Floras are—

- a. genuina* (the usual plant).
- b. album* (white flowered).
- c. roseum* (rose flowered).
- d. surreianus* (petals and sepals lanceolate and leaves dotted).

Reichenbach in his 'Flora Germanicæ et Helveticæ' describes two states of *Helianthemum vulgare*, Gært. (the *Chamæcistus*, Miller, of the present 'London Catalogue'), these being—

a. discolor (Figure 4,547).

b. concolor.

The concolorous variety of Germany would seem to be what in this island is the prevailing type, although there the exception rather than the rule. The variety I have to introduce has crimson-specked petals, and is the *discolor* of Reich. usual in Germany, as given above. I found it first in August 1902 on banks to the east of Hetchell Crag, between Thorner and Bardsey, in Mid-west York. Later I detected the same plant on Skirethorns Warren, near Kilnsey, and a few specimens in Bastow Wood, Grassington, in Mid-Wharfedale. After picking the first striking examples I have looked for it in what I thought to be likely-soiled areas about Silverdale, Arnside, and some other places on limestone, on the supposition that some chemical quality in the soil might account for its evolution, but, needless to say, in vain. Further, I am informed by Dr. Lees that the other red-spot species of *Helianthemum* are mainly associated with sand and marine influences. The technical definition of my plant is as follows:—*Helianthemum Chamæcistus*, Mill., var. *discolor*, Reich. (Icones 4,547). Leaves larger, more elongate-lanceolate than the English type, silvery felted beneath; sepals as in type, but tending to be flushed with pink. Petals maculate with blood-orange at base, and more or less specked with carmine at apex, both features retaining their coloration when dried. The Kilnsey plant is not so deeply maculate as the lime-soiled plant of Hetchell, but alkaline dolomitic soil can hardly be the effective factor, seeing that there is the vegetal colouring principle xanthophyll in *Helianthemum* as in *Hypericum*, which tends to concentrate the orange-yellow into red in the like-hued petals of both orders under the influence of direct sunlight, and the nitrogenous acid always found in rain-water.

From the evolutionary aspect, however, it is almost more than singular that this varietal item in our Flora should turn up in the identical district of Skirethorns and Grass Wood, which in 1883, 1890, and 1902 has yielded another lime-soil variety, the smaller blue Milkwort (*Polygala austriaca*, Crantz, var. *amara-depressa*), a lesser, perhaps hybrid, race of the rosetted *P. amara*, Linn., known as British, in Kent, Surrey, and on Cronkley Fell, North Yorkshire.

GLACIAL GEOLOGY OF THE NEIGHBOURHOOD OF DONCASTER.

HERBERT H. CORBETT, M.R.C.S.,

Doncaster.

THE phenomena presented by the glacial geology of this locality having been a puzzle to glacialists for some time, it may be worth while to make a statement of the observed facts, apart from any theories in connection therewith.

Firstly, there is at Balby an isolated patch of Boulder Clay about one mile long and half mile wide, with its long axis running nearly from west to east. Its northern side is bounded by Bunter Sandstone, with a capping of gravel in some parts. The relations of the Boulder Clay and the Bunter were well shown during some excavations in connection with the building of the Doncaster Workhouse at Balby a few years ago. The clay was seen to rest upon the sandstone at angles varying from 40° to 10° , the steeper angles being at the western end, and the slope being from north to south. In some sections large angular fragments of the sandstone were seen embedded in the clay. The base of the clay has been exposed in many of the sections at the Balby Brickworks, and it is always found to lie on a worn surface of Bunter. Its relation to the outlier of Magnesian Limestone on its southern side has never been exposed. The maximum thickness of the clay is about 40 feet. Eastwards it gradually diminishes in thickness until it merges into the low-lying land of Potteric Carr. The contained boulders are as follows:—

PERMIAN MARLS and GYPSUM.—Numerous.

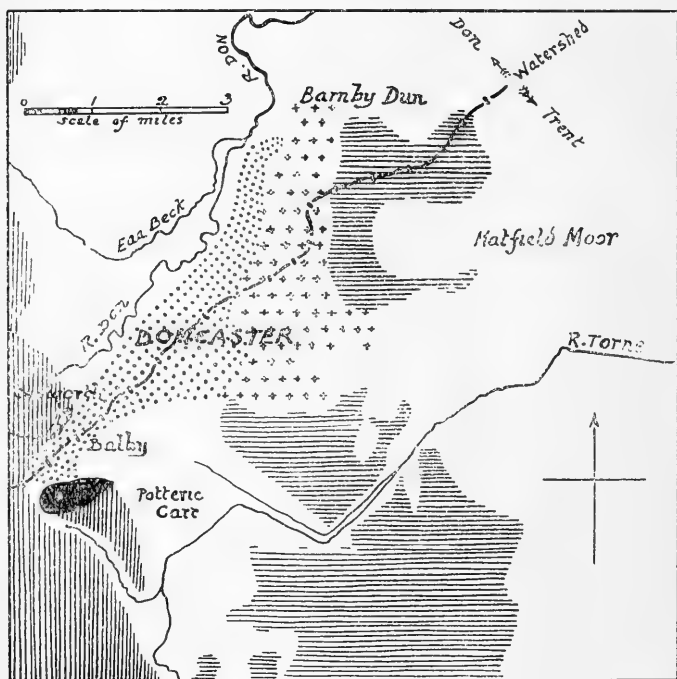
LOWER MAGNESIAN LIMESTONE.—Very numerous and many of them very large. Many of these are fossiliferous, containing casts of *Aximus*, *Mya*, *Turbo*, etc. The fossil bed whence they are derived crops out near Hampole and at several other places along the escarpment of the Magnesian Limestone, e.g., Conisborough and Clifton.

COAL MEASURE ROCKS.—These far outnumber all others. They consist of Grits, Sandstones, Gannister, Shale, Coal, Cannel, Clay-Ironstone, etc. Mr. Hemingway, of Barnsley, who has examined them, refers a large proportion of them to the Lower Coal Measures.

MILLSTONE GRITS.—Very numerous.

CARBONIFEROUS LIMESTONES, including YOREDALS and **CHERTS**.—These are abundant and very varied. Many are highly fossiliferous. A yellow fine-grained limestone has spines of *Hyalonema parallella*, and some of the Cherts consist almost entirely of the same fossil.

IGNEOUS ROCKS.—These, compared with the others, are very few. One may examine thousands of boulders without finding any far-carried erratics among them. Nevertheless a consider-



EXPLANATION OF MAP.

Black=Boulder Clay. Vertical lines=Magnesian Limestone. Dots=Gravel composed chiefly of Carboniferous Rocks. Horizontal Lines=Gravels composed chiefly of Quartzites. Crosses=Gravels containing a mixture of Carboniferous and Quartzite Rocks. Unmarked portion=Warp and Peat.

able number have from time to time been found, and among them are:—SHAP GRANITE, ENNERDALE GRANITE, QUARTZ PORPHYRY from the Vale of St. John; AUGITE ANDESITE from Borrowdale; DIABASE from Eycott Hill; WHIN SILL and numerous ashes, larvas, and agglomerates.

Naturalist,

There is another small patch of Boulder Clay about three-quarters of a mile north of the Balby deposit. No distant erratics have been found in this.

About four miles further up the Don valley, at Conisborough, is a third deposit of Boulder Clay. This is of very small extent and caps the Lower Magnesian Limestone at the Ashfield Brickworks. The contained boulders are nearly all of limestone from the immediate locality, but there are also a few well-striated Mountain Limestones with Crinoids.

At Cusworth boulders up to a ton in weight are turned up in the fields by ploughing. These consist of Grits, Gannisters, Mountain Limestone, Whin Sill, Quartz Porphyry, and Basic rocks that weather with a deep red crust. Of these the Whin Sills and Limestones are rounded as if water-worn, while the others are sub-angular. Along with these are quartzite pebbles from the Bunter Sandstone.

Eastward of Balby and spreading in a wide fan-shape between the river Don on the north and the outcrop of the Permian rocks on the south is an undulating country, all of which below 25 feet O.D. is warp and peat, and all above 25 feet and reaching to a maximum altitude of about 80 feet being covered with gravels. These gravels may be divided into three kinds:—1st, Coarse gravels, chiefly composed of Carboniferous rocks. 2nd, Finer gravels, but with many large stones in them, composed of a mixture of Carboniferous rocks and pebbles from the Trias. 3rd, Fine gravels, composed almost entirely of pebbles from the Trias. The range of these three gravels may be seen by reference to the map.

The Carboniferous gravels fairly follow the right bank of the Don from Balby to Barnby Dun. Wherever they are exposed in section they are found to be strongly current-bedded with the dip varying from 30° downwards invariably from N.W. to S.E., i.e., towards Trent. This is the case even where they are on the Don side of the watershed between Don and Trent. The contained stones are largely Sandstones, Clay-ironstone, Grit, and Gannister, but along with these are a considerable number of Cherts. Many of these are deeply weathered, this being particularly the case with those composed in a great measure of casts of Crinoids. The more compact ones contain Corals, Brochiopods, etc., and some are crowded with spicules of *Hyalonema parallella*. A very few Lake District rocks have been found also.

Eastward of these Carboniferous gravels the current bedding becomes much less marked, and at the same time the percentage of Trias-derived stones gradually increases. The average size of the stones also decreases, but large boulders of Grit, Chert, and Gannister are frequent, some of the latter being almost a ton in weight.

Further eastward still, and extending beyond the county boundary into Nottinghamshire and Lincolnshire, the gravels are almost entirely composed of quartzites and metamorphosed sandstones and grits from the Bunter Beds. But throughout this quartzite-gravel district there are numerous large sub-angular boulders, e.g., Whin Sill at Hatfield, Granite at Wroot, Millstone Grit at Everton, near Bawtry, etc. And near Harworth, Notts., is to be seen a section in a gravel pit with quartzite-gravel above and rounded boulders of fossiliferous Magnesian Limestone below.

About two and a half miles from Doncaster on the Thorne road are some old brickworks. The clay here is of considerable depth (over 30 feet) and is thinly laminated warp clay. It is situated at an elevation of about 40 feet above sea level. At Barnby Dun a similar clay is found, capped by mixed gravels. A boring for water at a point about 20 feet above sea level passed through 198 feet of this clay.

Such are the facts observed. I leave the explanation of these to others.

FUNGI.

***Lycoperdon flavosum*, Oed.**—This well-marked puff-ball was met with in Pecket Wood, Hebden Bridge, in August 1902, by Mr. J. Needham. It has been submitted to Mr. G. Masee, Kew, who states it to be as above, and a very good addition to the British Fungus Flora.—C. CROSSLAND, Halifax, January 1903.

***Humaria Roumegueri*, (Karst.) Sacc., var. *carnosissima*, Phil., in Crimsworth Dean, Wadsworth.**—While Messrs. Jonas Bradley (schoolmaster, Stanbury) and Keighley Snowden were walking over the moors at the head of Crimsworth Dean, 13th December 1902, they picked up some fine specimens of this somewhat rare Discomycete and forwarded them to the writer. On examination it was found to be an interesting form intermediate between the type and the var., nearer, if anything, to the latter. This is only about the second time it has been met with in Yorkshire.—C. CROSSLAND, Halifax, January 1903.

ECONOMIC FUNGI.*

J. H. HOLLAND, F.L.S.,

The Museum, Kew.

It may be safe to say that there is no order of plants so widely known and yet so little understood generally as the Fungi. There are several works dealing with this subject, but there is none which takes in all the useful fungi. This fact has induced me to endeavour to gather together all the information possible respecting them with the view of collating and presenting it in a convenient form for reference.

From the information already obtained from various sources the following is a selection, which I hope may prove of interest. A few of the fungi are well known, such as *Boletus edulis* and *Polyporus fomentarius*, and I have referred to them not so much to point out their virtues, as to give them a place in the distribution as British species, and from the fact that they are either the most prominent or the only species of their genus.

Altogether there are known to be about 22,500 species, comprised in 870 odd genera, under 46 orders, exclusive of the numerous forms classed as Fungi Imperfecti, the Saccharomycetes, and Myxomycetes. Out of this large number there are approximately only 200 species that are understood to be of any value. Of these, at least

86	belong to the Order	Agaricaceæ.
40	„	„ Polyporaceæ.
6	„	„ Hydnaceæ.
8	„	„ Clavariaceæ.
2	„	„ Tremellaceæ.
3	„	„ Phalloidaceæ.
10	„	„ Lycoperdaceæ.
15	„	„ Helvellaceæ.
5	„	„ Pezizaceæ.
3	„	„ Cyttariaceæ.
2	„	„ Hypocreaceæ.
8	„	„ Tuberaceæ.
3	„	„ Uredinaceæ.
1	„	„ Ustilaginaceæ.
1	„	„ Mucoraceæ.

The following table shows briefly their systematic arrangement. In the rest of the paper the few that are dealt with are taken promiscuously; particulars as to conditions of growth, country, and uses are given.

* Abstract of Paper read at the Y.N.U. Fungus Foray, Egton Bridge, 1st Oct. 1902.

1903 February 1.

SYSTEMATIC ARRANGEMENT.

Hymenomycetes	{	Agaricaceæ	...	<i>Amanita muscaria</i> Linn.
				<i>Chlorophyllum esculentum</i> Mass.
				<i>Volvaria esculenta</i> Mass.
				<i>Pleurotus cretaceus</i> Mass.
				<i>Coprinus indigocola</i> Oudem.
Gasteromycetes	{	Polyporaceæ	...	<i>Polyporus Myllittæ</i> C. & Mass.
				<i>Polyporus fomentarius</i> Fr.
				<i>Boletus edulis</i> Bull.
				<i>Hydnum repandum</i> Linn.
				<i>Hirneola polytricha</i> Mont.
Phycomycetes...	{	Ustilaginaceæ	...	<i>Scleroderma vulgare</i> Horn.
				<i>Rhizopogon luteolus</i> Tul.
				<i>Ustilago esculenta</i> P., Henn.
Pyrenomycetes	{	Hypocreaceæ	...	<i>Mucor exitiosus</i> Mass.
				<i>Daldinia concentrica</i> Fries.
				<i>Claviceps purpurea</i> Tul.
				<i>Cordiceps Hawkesii</i> Gray.
				<i>Cordiceps Sinensis</i> Sacc.
Ascomycetes ...	{	Cyttariaceæ	...	<i>Cordiceps Gunnii</i> Berk.
				<i>Cyttaria Gunnii</i> Berk.
				<i>Cyttaria Darwinii</i> Berk.
				<i>Cyttaria Berterii</i> Berk.
				<i>Morchella conica</i> Pers.
	{	Helvellaceæ	...	<i>Morchella esculenta</i> Pers.
				<i>Helvella crispa</i> Fr.
				<i>Chlorosplenium æruginosum</i> Tul.
				<i>Tuber indicum</i> Vitt.
				<i>Tuber melanosporum</i> Vitt.
	{	Tuberaceæ...	...	<i>Tuber aestivum</i> Vitt.
				<i>Charomyces meandriformis</i> Vitt.

***Amanita muscaria* L.** Britain and Europe generally and parts of Asia. On the ground. Used for poisoning insects, more especially by the Laplanders; as an intoxicant by the Russians, Kamtchatdales, and Koriacs, and formerly used in medicine as a cure for epilepsy.

***Boletus edulis* Bull.** Europe. On the ground. Commonly eaten on the Continent. The Italians dry them on strings for winter use, and in Hungary a soup is made from them when fresh.

There are 17 other species of *Boletus* recorded as being edible more or less, but none appear to be so generally recognised or so safe as *B. edulis*.

***Claviceps purpurea* Tul.** Spain and other parts of S. Europe. In the ovary of various grasses, chiefly Rye. The only fungus which now occupies a place in the British Pharmacopœia. Ergotine, the active principle of Ergot of Rye; used for producing uterine contraction.

Chæromyces meandriformis Vitt. Italy, Germany, Bohemia, and Britain. Underground. Known as the White Truffle.

Cordiceps Sinensis Sacc. China. On caterpillars. Supposed by the Chinese to have healing properties; sold as a drug in small bundles and eaten by them together with the caterpillar on which the fungus grows.

Coprinus indigocola Oudem. Java. On the refuse of Indigo (*Indigofera tinctoria*) after the colouring matter has been extracted. Edible.

Chlorophyllum esculentum Mass. British Guiana. On the ground. This is an edible species and, together with *C. Morgani* Peck. and *Chlorospora Eyrei* Mass., form the new section *Chlorosporæ* or green-spored Agarics recently constituted by Mr. Masee.

Chlorosplenium æruginosum Tul. Australia; Europe. Wood stained with the mycelium was used at one time in the manufacture of Tunbridge ware and fancy work.

Cyttaria Gunnii Berk. Tasmania.

Cyttaria Darwinii Berk. Tierra del Fuego.

Cyttaria Berterii Berk. Chili.

Growing parasitically on the living branches of ever-green Beeches, and all are edible, the one in Tierra del Fuego affording for several months the staple food of the inhabitants.

Daldinia concentrica Fr. Europe, United States, Australia, Tasmania, and West Africa. On dead trunks. Used by the natives of West Africa as a purgative medicine, being mashed up and mixed with lime-juice, the quantity of *Daldinia* for a dose forming, when mashed, a small ball about half an inch through with the juice of half a lime.

Hydnum repandum Linn. Europe and United States. On trunks. The genus *Hydnum* appears to be the only one of the group which is edible. In addition to *repandum* there are at least five species recorded as being eaten:—*H. imbricatum* Fr., in Germany, Austria, Switzerland, and France; *H. lævigatum* Swtz., in the Alpine districts; *H. coralloides* Scop., in Germany, Switzerland, and France; *H. Caput-Medusæ* Bull., in Austria and Italy; *H. erinaceum* Bull., in Germany and France.

Hirneola polytricha Mont. Australia, New Zealand, and Africa. On decaying trees. Forms an important article of food in China. The average value is £45 per ton, and China appears to be the only market. This fungus

is one of the few that can be classed as being of any special commercial value.

Helvella crispa Fr. Europe; India. Amongst grass. Edible.

Morchella esculenta Linn. Europe and Asia. In woods.

Well known in the markets as the Morel. This species is the one most commonly eaten in Europe. *M. deliciosa* Fr., in Java and Cashmere; *M. bohemica* Kromb., in Bohemia; *M. gigaspora* Cooke, in Cashmere; *M. rimosipes* DC., in France and Bohemia; *M. caroliniana* Bosc., in S. United States.

Mucor exitiosus Mass. Cape of Good Hope. Parasitic on insects; cultivated to destroy Locusts and Cockroaches.

Polyporus Mylittæ Cooke & Mass. Tasmania. The *Sclerotium* is eaten by the Tasmanians and known as native bread.

Polyporus fomentarius Fr. Europe. On trunks. The Amadon or German tinder, not used so much as formerly.

Pleurotus cretaceus Mass. N. India. Sold by the shopkeepers at Peshawar at an average rate of 2½ rupees a seer (= 2 lbs.). It is said to be eaten with great relish and considered rare enough to present to friends.

Pleurotus ostreatus Jack. (Oyster Mushroom.) Is relished in several districts in this country.

Rhizopogon luteolus Tul. Japan. Pine Forests. Edible.

Rhizopogon provincialis Tul. Is eaten by the peasants in Provence.

Tuber æstivum Vitt. Europe. Underground. This is the Common Truffle of this country.

Tuber melanosporum Vitt. Europe. The French Truffle; always commands a high price in the markets.

Tuber indicum Cooke & Mass. India. Is eaten by the natives in the Himalayas.

Ustilago esculenta P., Henn. Japan. Parasitic on the stems of *Zizania latifolia*. The diseased stems are sold as a vegetable in the market of Hanri, Tonkin. In Japan the spores are used by the women for dyeing hair, and they are also much used in connection with lacquer ware. This fungus is notable as being the only *Ustilago* of any economic value.

Volvaria esculenta Mass. Nigeria. On coffee pulp. This Agaric has recently been described. It is edible, and grows on the coffee pulp after the refuse has become heated.

I am indebted to Mr. Massee for much assistance, and to Mr. A. Clarke and Mrs. Rushton for photographs and drawings.

SOME NOTTINGHAMSHIRE TERRESTRIAL ISOPODA.

PROF. J. W. CARR, M.A., F.L.S.,
University College, Nottingham.

As I can find no mention of any Nottinghamshire Woodlice in any published work, it may be worth while to place on record the result of some casual gatherings of these Crustacea made during the past summer (1902). No special search was made, only those specimens that came in my way while collecting other material being secured. Doubtless a systematic search in suitable localities would result in the discovery of several other species. My thanks are due to Dr. Scharff, of the Science and Art Museum, Dublin, for kind assistance in identifying my captures. The nomenclature is that adopted by Dr. Scharff in his articles on Irish Woodlice in the *Irish Naturalist* for January and February 1894. The names in parentheses are those used by Bate and Westwood in the *British Sessile-Eyed Crustacea*, Vol. II.

Trichoniscus pusillus, Brandt. (*Philougrina riparia*). Among *Conocephalus conicus* on the steep bank of a stream at Burton Joyce.

Porcellio scaber, Latr. Very common under plant-pots and stones in Nottingham gardens and elsewhere.

Metoponorthus pruinus, Brandt. (*Porcellio pruinus*). In considerable numbers under a log in a Nottingham garden.

Platyarthrus Hoffmannseggii, Brandt. I have not found this species about Nottingham, but the Rev. Alfred Thornley recently sent me specimens taken by him at Clarborough, near Retford. It is pure white in colour, destitute of eyes, and lives in Ants' nests.

Oniscus asellus, Linn. Abundant everywhere in and about Nottingham under plant-pots in gardens, under stones, logs, bark of trees, etc.

Philoscia muscorum, Scop. Sherwood Forest, near Edwinstowe, under stones among bracken.

Armadillidium vulgare, Latr. (*Armadillo vulgaris*). The 'Pill-millipede,' so called from the facility with which it can roll itself into a ball when alarmed, occurred in some numbers under stones in a Nottingham garden. I also took one while it was running across a road near Bulwell, on a sunny afternoon in June, an unusual occurrence for so entirely nocturnal an animal.

NORTH LANCASHIRE GALL NOTES IN 1902.

S. LISTER PETTY,

Ulverston.

THE order is that of Mr. Connold's 'British Vegetable Galls.'

Cecidomyia bursaria, Bremi. On *Nepeta glechoma*. Hedge-bank near Marl Park, outside Ulverston, 24th September. In one case, three galls on a leaf stalk.

Erlophyes galli, Karp. On *Galium aparine*. Road between Foxfield and Wreaks End, but in no great quantity (19th August). Lane from Water Yeat to Arklid (19th Sept.). Very fine on the roadside between the Blacking Mill and Newland (28th July). Of this I have a good photo. West End Lane and waste ground about the cemetery, Ulverston.

Cecidomyia urticae, Perris. On *Urtica dioica*, L. Fairly well distributed. Roadside between Water Yeat and Lake Bank. Near Nibthwaite Grange. Side of road near Marl Park—very fine; and by roadside from Dragley Beck to Conishead, and waste ground in cemetery, Ulverston. Very fine on the pathway to railway station at Bolton-le-Sands (V.C. 60).

Aphis atriplicis, L. On *Chenopodium album*. Roadside near Stone Cross, outside Ulverston, 9th July. In the shrubbery, Dale Street Board School. In the first instance many of the leaves bore full and empty cases.

Brachycolus stelleriae, Hardy. On *Stellaria holostea*, L. Roadside below Bell Wood, between Lowick Bridge and Nibthwaite. Lane from Water Yeat to Nibthwaite. On roadside near Broad Dale, near Ulverston (11th August). Of the latter I have a photograph.

Diplosis loti, DeGeer. On *Vicia sepium*, L. Hedgeside road between Swarthdale and Swarthmoor Hall (11th August).

Siphocoryne xylostei, Schrk. On *Lonicera Periclymenum*, L. Two clusters on Stoney Brow, near Broughton-in-Furness. Lane, Water Yeat to Arklid (8th September).

I sent a plant of *Vicia sepium* and *V. hirsutum* to Mr. E. T. Connold, of St. Leonards, and he was good enough to tell me that the galls were, in their present condition, undeterminable; the maker may be either *Diplosis loti* or *Cecidomyia lathyri*, both from West End Lane.

—Naturalist,

I have seen also the supposed ubiquitous species on *Acer Pseudoplatanus* (*Phyllocoptes acericola*), *Corylus* (*Eriophyes arvelanæ*), *Prunus spinosa* (*E. similis*), *Rosa canina* (*Rhodites rosæ*), and *Rosa spinosissima* (*R. spinosissimæ*), this last near Arnside, V.C. 69, Westmorland portion, *Cratægus monogygna* (*Cecidomyia cratægi*).



REVIEWS AND BOOK NOTICES.

The Flora of the East Riding of Yorkshire, by **James Fraser Robinson**, with list of **Mosses** by **J. J. Marshall**. A. Brown & Sons, Ltd., 5, Farringdon Avenue, E.C. 7s. 6d.

The 'Flora of the East Riding of Yorkshire,' in light green apparel, with suggestions of aquatic plants, and with head and tail piece sketches of local places, contrasts strongly with the 'Flora of West Yorkshire,' thick, solid-looking, but 'full of strange oaths'; while both look much more impressive than the paper-covered numbers of the unfinished 'North Yorkshire.' Yet the plain covers of the last enclose a study on plant-distribution which has elevated it from a list of species and localities interesting only to the local botanist, into a standard work on plant-distribution, of interest all the world over. Since the earlier part of 'North Yorkshire' was penned the study of plant-distribution has advanced much, and the author of a Flora has to-day many demands to satisfy. The day is past when a statistical list of natives, casuals, etc., with their localities, can be accepted as a Flora; although in the case of Algæ, Fungi, and Mosses, groups imperfectly investigated as yet, we must content ourselves for a time with lists and notes on localities. It is now expected that the author of a Flora should not merely give statistics, but should interpret them and attempt to advance some aspect of plant-life. In 'North Yorkshire' the account of the geology becomes, in the chapter on lithology, the key to the solution of problems in an area with a complex but interesting flora and geology. The account of the climatology is correlated with its results on plant-life. The descriptions of the river-basins are pictures of the vegetation to which Yorkshireman or stranger can turn again and again and see new points of beauty; it lacks completeness only because the pictures are river-valleys, and the moorlands between are left in the background. The author of 'The Flora of West Yorkshire' has appreciated Mr. Baker's lead in following up Thurmann's principles. By using Davis and Lees' 'West Yorkshire' one gets again a series of pictures of the vegetation, whose greatest

defect is that one can find out the rarer plants, but not the common ones, which, after all, give the landscape its character from the botanical point of view. It was, therefore, no easy task which lay before the author of a Flora of the East Riding. In the Floras of the North and West Ridings the list of species is important, but the preliminary chapters are, at least, equal in importance. In the 'Flora of the East Riding,' now published, the list of species is of much greater importance than the first fifty pages of preliminary matter. No attempt is made to utilise the details collected in seventeen years to advance any problem in distribution. The East Riding may lack the variety of hill-vegetation found in the North and West Ridings, but it has its own points of interest. It has a rich aquatic vegetation contrasting with a very dry 'Wold' vegetation; it has glacial sands sharply defined from the moist, cool boulder-clays; it has sea cliffs, estuarine mud alluvial, and dry sea-coast sands, each with its own type of plant-life. The hurried and general reference to these types of vegetation is not of much use to one unfamiliar with the Riding who may be in search for information. The author seems to have some distinct ideas about maritime and estuarine floras (see p. 36), but his notes do not allow us to discover which are the 24 maritime species, which the 23 estuarine. The absence of any elevation above 800 feet is considered a sufficient reason for the omission of altitudinal range of plants. Altitude records may be deceptive, because a single station may raise the range of a species far above the normal range, but they are useful; in our own case we looked to this Flora with eagerness to verify or control a little investigation on the range of aquatic plants begun in 'North Yorkshire,' but this could not be done. The question of indigenous versus introduced plants is an important one in the East Riding. The list of escapes, etc. (pp. 47-53), chiefly from Hull Docks, is therefore appropriate and will solve many a puzzling find. It would, however, have been judicious to give reasons in some cases for the statement 'native' or otherwise. Thus the Beech tree is given as native. In 'North Yorkshire' it is given as a denizen, although occurrence as a native is suggested; in 'West Yorkshire' it is allowed to be native only on the Permian tract. It is thus obvious that in or near East Yorkshire we have the boundary limit of the Beech; it is a question which has been raised frequently, and we should have liked to see it discussed rather more in detail. The map of the East Riding provided with the book is on too small

a scale to be of much use; its redeeming feature is that it shows the areas where glacial or alluvial deposits are present. To call this a map of 'Geology and Flora' is ambitious. There are now in the market several excellent road-maps, clearly printed and with altitude shading or colouring; it will be necessary to use a map of this kind before one can find the localities mentioned in the Flora, or fully realise the author's reasons for selecting the botanical areas. The short account of the physiography of the East Riding only whets the appetite for more, and it contains the embryo (which we trust will come to maturity) of an account of the evolution of plant-life on land reclaimed from the Humber estuary. The topographical summary and the few pages on the distribution of East Riding plants reveal how interesting the Riding really is, and how much could have been made of it. The summaries of East Riding plants (pp. 41-46) need not have been so numerically carried out. With the exception of that of genera, etc., it is quite probable that another botanist would come to different results. The attempt to arrange the species into habitats is an unfortunate medley. Hygrophiles and xerophiles are habitat groups generally admitted; maritime and estuarine would probably have fitted in better as subdivisions of halophytic plants; the large number (one-third of the total) of 'ordinary (growing on dry land generally)' is an admission of weakness; while to designate denizens, colonists, aliens, and incognita as habitats is not in strict accordance with the meaning of the word. A little guidance from 'North Yorkshire,' or the now standard text-book of Warming would have prevented this. The local names of plants are few for an agricultural county, e.g., *Spergula arvensis*, *Plantago major*, and many others seem to have escaped local baptism. 'Blood Geranium Cranesbill' has a better-known, though less elegant, name; while 'rough rigid Trefoil' is certainly stiff.

The list of Mosses is by another pen, and it is well that it forms but an appendix. The list looks short, but this is explained when one finds that nearly 60 species and varieties recorded in *The Naturalist* for the East Riding since 1898 have been omitted, to say nothing of a larger number of locality records. On pages 237, 239, and 243 names occur without localities, and on pages 239 and 242 the same species are repeated under different names, while *Tortula montana* and *Physcomitrella patens*, marked as new East Riding records, were recorded by Mr. Marshall himself in this journal in 1898, p. 240.

It must not be forgotten that the 'Flora of the East Riding' represents a large portion of the busy life of an enthusiastic field-botanist. As such it is worthy of all respect, and to the local botanist should form a stepping-stone to higher things. Its shortcomings are due to recent great advances in regard to plant-distribution; an advance which we are proud to think that 'North Yorkshire' did much to bring about, and which we regret to see has been but poorly followed up in recently-published Floras.

W. G. S.

The December *Halifax Naturalist* is an exceptionally interesting number and contains several notes on the natural history of the district, also an instalment of the 'Flora of Halifax.' A paper by Mr. C. E. Moss, B.Sc., on the 'Moors of South-west Yorkshire' is a valuable contribution to our knowledge of the vegetation of these interesting tracts; it is illustrated by very suggestive diagrams showing the dominant types of vegetation. In the same number is a list of the 'Vertebrates of the District,' by Mr. H. Pickles; this includes 14 mammals, 2 reptiles, 4 amphibians, and 14 fishes.

A most important 'Contribution to the Freshwater Algæ of the North of Ireland' has just been made by a past President of the Yorkshire Naturalists' Union, Mr. W. West, and his son, Prof. G. S. West ('Transactions Royal Irish Academy,' Vol. 32, Section B, Part I., August 1902, plates). This magnificent work includes particulars of over a hundred species new to Ireland, over a dozen of which are new to science, and described for the first time. That little attention appears to have been paid to the algæ flora of Ireland in the past is shown by the fact that not a single record had previously been made for Donegal.

'The Geology of the Great Whin Sill, an Analysis of the Theory of Intrusion,' is the title of a pamphlet of 89 pages, just issued by Mr. John Lee, A.R.C.A., Darlington. The writer takes for his text a statement made by Teall:—'It is now admitted on all hands to be intrusive,' but apparently does quite agree with the 'intrusive' character of the Whin Sill. He states (p. 88), 'All the thought and ingenuity which its authors have put into its construction is repeated *ad infinitum* in the one pathetic formula, 'intrusion and contact metamorphism,' in answer to every question that it is possible to put in regard to the Whin Sill.' The pamphlet is illustrated by diagrams, one of which (p. 82) is rather curious.

In 1891 the late Thos. Hick described to the Linnean Society a new fossil plant found by Mr. W. Cash, at the Cinder Hills, Siddal, near Halifax, to which he gave the provisional name of *Tylophora radiculosa*, afterwards altered to *Xenophyton radiculosum*. Hick felt some doubt as to its systematic position and preferred to leave the question of its relationship open, although the late Prof. Williamson was of opinion that its affinities were with *Stigmaria*. By the purchase of the Hick and Cash collections by the Manchester Museum several transverse and longitudinal sections of this fossil came into the possession of that Museum. Prof. F. E. Weiss has recently carefully examined these specimens, and is of opinion that the plant was of stigmarian character, and that it can be identified as the 'root' or rhizome of a *Lepidophloios*, probably *L. fuliginosus*. Prof. Weiss' views are expressed in detail in 'Notes from the Manchester Museum, No. 8' (publication 37). 1902. 19 pp. and 3 plates.

Naturalist,

FIELD NOTES.

MAMMALS.

Common Seal at Teesmouth.—A specimen of the Common Seal (*Phoca vitulina*) was captured alive by a pilot on the sands near the Tees Breakwater, on Sunday, 7th December 1902, and brought to Redcar, where it is being exhibited in the Lifeboat House. See 'Handbook of Yorkshire Vertebrate,' p. 8, for reference to the abundance of this species at the Tees mouth a century ago.—T. H. NELSON, Redcar, 2nd January 1903.

Seal at Ulrome.—A young Seal, presumably the Common Seal, was caught on the sands at Ulrome, near Hornsea, on the morning of 30th December. It was taken to Bridlington and is being exhibited there alive. It is a young specimen. Another example, 4 feet 2 inches long, was recently caught at Barmston, and has since died. Another was washed ashore, dead, at Wils-thorpe, a few weeks ago. They are all examples of the Common Seal (*Phoca vitulina*). In my opinion Seals are not at all uncommon in this district, but they are shy and not often seen. A few years ago I frequently heard of them in the vicinity of Barmston outfall.—THOMAS BOYNTON, Bridlington, 3rd Jan. 1903.

BIRDS.

Little Bustard at Kilnsea.—On the evening of 7th December a Little Bustard (*Tetrax tetrax*) was shot at Kilnsea, near Spurn. As it was dusk at the time the bird was not found until the following morning, when it had been considerably damaged by a cat. This is the first record of its kind I can remember in our neighbourhood.—P. W. LOTEN, Easington, 24th Dec. 1902.

[In Handbook of Vertebrate Fauna (Clarke and Roebuck), one at Beverley prior to 1844 (Allis); one in Holderness (*The Naturalist*, 1896, p. 132). Cordeaux in 'Birds of the Humber District' refers to a specimen which was shot at Leven on 31st January 1862.—EDS.]

Flamingo in Lincolnshire.—On Saturday morning, 22nd November 1902, Mr. J. Hall, of Kirton Marsh, shot a male Flamingo (*Phaenicopterus roseus*) which was swimming in the middle of the river at the outfall of the Welland. The plumage was in perfect condition, and the appearance of the bird indicated that it had been driven into this country by the recent stormy weather. The specimen measured 5 feet 8 inches in total length, and 6 feet from tip to tip of the wings. This is probably the specimen which escaped from Woburn Park recently.—F. M. BURTON.

LEPIDOPTERA,

Convolvulus Hawkmoth at Barlby.—A specimen of the Convolvulus Hawkmoth (*Sphinx convolvuli*) was taken at Barlby, near Selby, September 1901, and is now in the Selby Museum, where I have seen it.—W. HEWETT, York, 6th January 1903.

Privet Hawkmoth.—A pupa of the Privet Hawkmoth (*Sphinx ligustri*)—one of a number received from Suffolk in the autumn of 1901, and due to emerge in June 1902, was alive on 12th October 1902 and on 3rd January 1903. The pupa is still alive and healthy. This is a very unusual occurrence.—W. HEWETT, York, 6th January 1903.

***Sphinx pinastri* at Middlesbrough.**—I recently had the opportunity of examining a specimen of this Hawkmoth that had been taken in a garden at Linthorpe, Middlesbrough, in 1900. The insect was not in very good condition, the edges of the wings being damaged and the colouring faded. It would probably either be an immigrant or have come into port with some ship, Middlesbrough being within easy distance of the sea, and the garden in which it was taken only being some three miles from the docks.—T. ASHTON LOFTHOUSE, Middlesbrough, 12th January 1903.



COLEOPTERA.

***Miccotrogus picrostris*, F., in Cumberland.**—On the 1st of July last I took a single specimen of this rare Weevil by general sweeping in Gelt Woods. So far as I am aware there is no record from this county. According to Fowler it is very rare in the north.—JAS. MURRAY, Carlisle, 27th December 1902.

Coleoptera near Carlisle in 1902.—The year 1902 has been a poor one for beetles, but, notwithstanding, some good things have been found. *Bembidium femoratum* turned up on the Petteril on 12th April and 11th October; *Chrysomela fastuosa*, sitting on a stone in Gelt Woods, 10th May; *Podabrus alpinus*, near Wreay, 7th June. At Orton on 14th June occurred *Prasocuris aucta*, *Telephorus figuratus* (commonly), and *Dasytes plumbeo-niger*. In the bed of the river Irthing, near Gilsland, on 2nd July, I took a specimen of *Ægialia sabuleti*. Among gravel on the Gelt on 9th August I took several specimens of *Homalota currax* and *Tachyusa umbratica*, and in grass tufts by the Petteril on 11th October a number of *Melanophthalma fuscula*. JAS. MURRAY, Carlisle, 27th December 1902.

BOTANY.

***Sedum villosum* near Ingleton.**—Referring to the note on *Sedum villosum* at Ingleborough in *The Naturalist* for December 1902, p. 384, it may be of interest to record that I found it last July in Chapel-le-dale, about half a mile from the Vicarage, where it was growing on a bare piece of ground near the stream in some quantity.—WM. R. LINTON, Shirley Vicarage, Derby, 5th December 1902.

Cheshire Plants.—There is a small patch of boggy ground in the waste land about Birkenhead Docks which I examined for the first time this summer (1902). Amongst the more interesting plants noted were *Carex ovalis*, Good. ; *Carex Curta*, Good. ; *Hypnum riparium*, var. *longifolium*, Schimp, and *H. aduncum*, var. *polycarpon*, Bland. The two carices referred to occur together on the opposite side of the Mersey, near Aintree, but I am not aware of any record for the Wirral peninsula. The two mosses also occur with the sedges near Aintree!—J. A. WHELDON, 60, Hornby Road, Walton, Liverpool.

Plants in the Motley Herbarium (page 344 ante).—The locality for *Vaccinium Votis-ideaa*, 'Cloffa Pikes,' is in Lancashire West (V.C. 60). The entry is apparently rendered doubtful because of the unusual phonetic spelling of the name, which is rendered 'Clougha' on the maps. The plant named still grows there plentifully, with much else of interest. Mosses and hepaticæ are especially abundant and luxuriant amongst the huge roughly-piled blocks of gritstone. Mr. Stabler wrote long ago 'Clougha is a wonderful place for mosses.' Surely high praise from one who has so ably investigated the moss-flora of a county so rich as Westmorland!—J. A. WHELDON, Liverpool.

***Kantia submersa*: a new British Hepatic.**—A species of *Kantia*, gathered by us on Cockerham Moss, West Lancashire, in 1900, after lying in the herbarium since then as an unsolved enigma has been at length satisfactorily determined to be *Kantia submersa*, Arnell. Mr. Macvicar suggested this name last year, and recently we submitted specimens to Arnell himself, who confirms the name, and says the Cockerham plant is interesting in bearing gonidial gemmæ, which had not been observed when the original description of the species was drawn up. *K. submersa*, Arnell, has hitherto only been found in Sweden and Denmark, but will probably be found elsewhere if sought in very wet places on moors and bogs.—A. WILSON and J. A. WHELDON, Liverpool.

NORTHERN NEWS.

Mr. T. H. Nelson, M.B.O.U., of the Cliffe, Redcar, would be glad to receive information respecting the weight, plumage, and dimensions of any Grey Geese shot in Yorkshire, as well as dimensions and colours of bills and legs. He would also be glad to receive entire heads of freshly-killed Grey Geese.

Mr. W. Pickstone contributes a paper 'On Sections of the South Lancashire Coalfield in the Township of Pilkington and the Parish of Bury' to a recent issue of the 'Transactions of the Manchester Geological Society' (Vol. 27, Part 10). The sections are most interesting to the author, as all the seams of the Lancashire coalfield are exposed in the area, and have cost him £70,000.

We regret to have to record the death of the Rev. Prof. T. Wiltshire, formerly Professor of Geology and Mineralogy at King's College, London, and Secretary of the Palæontographical Society from 1863. Yorkshire geologists will recollect that so long ago as 1859 Prof. Wiltshire contributed a valuable paper 'On the Red Chalk of England' to the Geologists' Association, in which several Yorkshire specimens were figured.

'Sea-birds and Plovers noticed in Lancashire and Cumberland' is the title of a paper by Thomas Hepburn in the October *Zoologist*. The following birds are referred to:—Ringed Plover, Golden Plover, Lapwing, Oystercatcher, Common Snipe, Common Sandpiper, Redshank, Common Curlew, Sandwich Tern, Common Tern, Lesser Tern, Black-headed Gull, Herring Gull, Lesser Black-headed Gull, and Guillemot.

At the annual meeting of the Lincolnshire Naturalists' Union, held at Lincoln on 11th December, reference was made to the proposed establishment of a museum in the Grey Friars, Lincoln, by the City Council. It is a pity that a public museum was not in existence long ago, as many most valuable local relics have been removed from the county. The Rev. A. Thornley, M.A., delivered an address on 'The Equipment of the Field Naturalist,' and Mr. H. Preston, F.G.S., was elected President for 1903. The field meetings held in 1903 will be at Huttoft and Panton.

We regret to announce the death of Mr. George Dent, of Harrogate, which took place on the evening of 23rd December with most painful suddenness. The deceased gentleman, who has always enjoyed the best of health expired without a moment's warning. Mr. Dent was passionately fond of the country and its pursuits, and during the last few years had devoted himself to the study of ornithology. He possessed a very good collection of eggs. He was an enthusiastic angler all his life, and few excelled him in this sport. He was a most unassuming and unselfish man; indeed, it is doubtful if it would be possible to find one who could put himself so much in the background to assist others. His early decease, he being only 40 years of age, is deeply regretted by all his friends.

Mr. N. F. Dobrée, F.E.S., of Beverley, an occasional contributor to these pages, has presented his valuable collection of European Noctuæ to the Hull Municipal Museum, where it finds a home with the Swailes' collection of eggs and other important natural history collections. The Dobrée collection, which is well known to Yorkshire entomologists, is arranged in a cabinet of 52 drawers, and contains over 5,000 specimens. It is also interesting as it includes a large number of preserved larvæ—Mr. Dobrée being probably the first in this country to preserve larvæ with their natural colours. The collection is perhaps the best of its kind in the country, and contains species not represented in the national collections at the British Museum. It will be especially useful as a reference collection to Yorkshire lepidopterists, as it contains continental representatives of many of our county noctuæ of forms totally different in appearance to them.

NOTES AND COMMENTS.

DERBYSHIRE ROCKS.

Mr. Jonathan Barnes, F.G.S., the President of the Manchester Geological Society, has contributed some interesting notes to the 'Transactions' of his Society, relative to the rocks of Derbyshire. The first, 'On a Metamorphosed Limestone at Peak Forest,' describes the changes in the Carboniferous Limestone due to the contact of an igneous rock. These are admirably shown in the accompanying illustration, for which we are indebted to the Council of the Manchester Society. Fig. 1 is a section of the unaltered limestone, with remains of



Fig. 1.



Fig. 2.

Encrinurites, Polyzoa, and Foraminifera. Fig. 2 is the same rock after contact with the dyke, when it exhibits a saccharoidal structure resembling statuary marble. Both examples are magnified fifteen diameters. In his 'Further Observations on the Changes brought about by the Intrusion of Igneous Matter into the Carboniferous Limestone of Peak Forest,' published in a later part of the 'Transactions,' Mr. Barnes describes and figures some beautiful small quartz crystals occurring in the limestone.

LIVERPOOL BIOLOGISTS.

If the health and vigour of a society can be measured by the bulk of its Transactions the Liverpool Biological Society must be in an enviable position. The volume recording the 'Proceedings and Transactions' of the past session (Vol. XVI., Session

1901-1902) extends well over 500 pages, more than half of which are concerned with a memoir on *Pleuronectes* by Messrs. Cole and Johnstone, and one on *Chondrus* by Mr. O. V. Darbyshire.

The issue of these memoirs (Nos. VIII. and IX. of the series) is a feature peculiar to the Liverpool Biological Society, and is altogether admirable. Already teachers and students have found them of great value, and those included in the present volume more than sustain the high standard attained in former years.

Another feature always looked forward to with great interest is the 'Annual Report of the Liverpool Marine Biology Com-



Slab of Sandstone probably from Storeton.

mittee and their Biological Station at Port Erin,' by Professor Herdman. In this he gives a resumé of the work done by members of the L.M.B.C. in the Irish Sea, at the Port Erin and Piel Laboratories. The work at Port Erin has outgrown the accommodation of the old station, and the past year has been marked by the opening of new buildings, which include an aquarium, laboratories, and a fish hatchery. The volume includes a simply-worded guide to the biological station, which will doubtless prove of great interest to workers and visitors to Port Erin.

The presidential address on the Fauna indicated in the Lower Keuper Sandstone is an attempt to classify and extend our knowledge of the animals which have left traces in the Triassic rocks, and as such will be of interest to biologists and geologists alike. There is a great field for work in this direction, and the subject would well repay workers in other favourable parts of the kingdom. The accompanying illustration (kindly lent by the Society) shows a slab of sandstone with natural casts of two series of footprints. Other papers on Red Sea and Indian Ocean Copepoda by A. Scott, and on Snake Venoms by Dr. Hanna, will appeal to specialists. The volume closes by a paper on the place of Geology in Economics and Education by Professor Lapworth. Although it is difficult to see how such a paper finds a place in the Proceedings of a Biological Society, it will repay careful study and forms perhaps the finest *apologia* for geology which has ever been written.

BOTANICAL SURVEY OF YORKSHIRE.

We are glad to find that steps have been taken to acquaint the societies associated with the Yorkshire Naturalists' Union with the work of the Botanical Survey Committee. By the generosity of Mr. John Farrah, reprints of Dr. Smith's paper on 'Botanical Survey for Local Naturalists' Societies' (*The Naturalist*, January 1903) have been sent to the secretaries of these societies, and it is hoped they will do their best to place the copies entrusted to them in the hands of those most likely to take up the scheme as there outlined. If further copies are required, they may be had on application to Dr. Smith, Yorkshire College, Leeds. Some years ago (*The Naturalist*, 1899, p. 353) Mr. Arthur Bennett, in commenting on Lord de Tabley's 'Flora of Cheshire,' said: 'The future Floras of Britain will not be quite in the same groove as those gone by; already the idea that is being so strongly worked out in America with regard to what Hackel called the oecological conditions of a Flora may perhaps be looked for in Britain before long.' Unfortunately, local floras are still published, the authors of which seem quite unacquainted with the advances made in this direction.

It is the object of the survey to encourage investigations on these lines, and we would strongly urge upon all engaged in the preparation of local floras to take advantage of the opportunities here afforded, and we are confident the result would be a step greatly in advance of the bare lists now so common. We wish the scheme every success.

WHITE'S THRUSH IN YORKSHIRE.

What is apparently the fourth example of White's Thrush recorded for Yorkshire has just been placed in the Halifax Museum, having been shot in Luddenden Dean, near Halifax, on December 18th last. The first example of this species recorded in Britain was shot in Hampshire in 1828, and Eyton gave it the name of White's Thrush (*Turdus whitei*), in honour of Gilbert White. Previous Yorkshire records are:—Huddersfield (1864), Danby-in-Cleveland (1870), and Whitby (1878).



White's Thrush *Oreocichla varia* (Pall.).

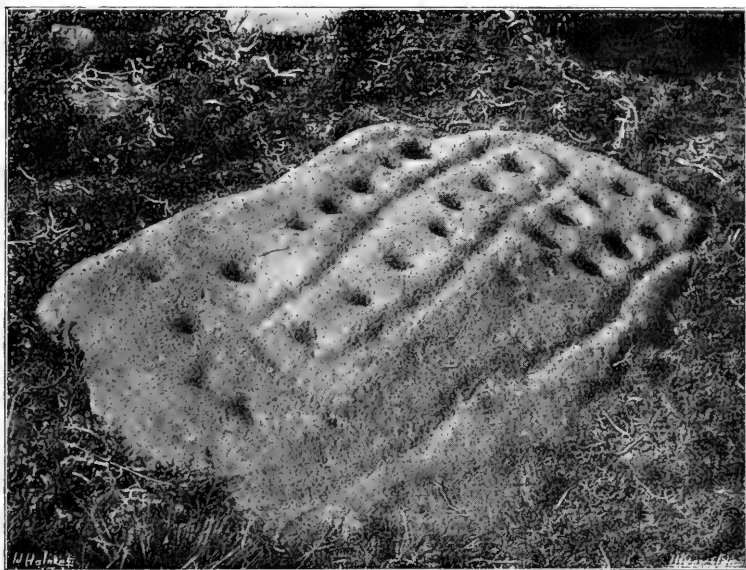
A full account of the latest specimen appears in *The Halifax Naturalist* for February, from the pen of Mr. A. Crabtree, F.L.S., which is illustrated by the accompanying block, kindly lent by the Editor.

PREHISTORIC REMAINS NEAR BRADFORD.

The inhabitants of Bradford are certainly to be congratulated on the good work the Bradford Corporation has recently accomplished in connection with the preservation of the pre-historic relics surrounding their city. The corporation, having acquired

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Baildon Moor, the Bradford Historical and Antiquarian Society sent a memorial to the city authorities urging them to preserve the various stone circles, burial mounds, entrenchments, and cup and ring markings situated on the moor. A plan was prepared upon which the various relics of the early inhabitants of the area were shown, and eventually the corporation visited the moor, accompanied by the leading local antiquarians. It was suggested that the larger examples (stone circles, entrenchments, etc.) should be protected by railings, whilst the cup and ring markings, often occurring on small boulders, should be



Cup and Ring marked boulder on Green Crag, Rombalds Moor.

transferred to the Cartwright Memorial Hall. This is an excellent idea, and in the case of the examples too large for removal we would suggest that plaster casts be taken, after the manner of those from Ilkley, etc., preserved in the Leeds Museum.

In a capital account of the pre-historic antiquities of the Bradford district in the *Bradford Antiquary*, Part 7, 1902, Mr. Butler Wood describes the various pre-Roman relics found on Baildon Moor, as well as on Rombalds Moor and Harden Moor. In addition to the objects already referred to, flint weapons and implements, bronze weapons and ornaments, and pit dwellings are enumerated. Two valuable plans and several

excellent illustrations accompany the paper, one of which is here shown, through the kindness of Mr. Harry Speight. It illustrates one of the examples of cup and ring markings, the precise significance of which may never be known. Probably the least satisfactory of all the evidences of early man are the pit dwellings. Some of the shallow pits on the moors, which were thought to be ancient habitations, eventually proved to be old coal workings, and it seems not improbable that the accepted pit dwellings may be otherwise accounted for. At any rate a little more evidence will be required than mere hollows on a moor before archæologists will accept them as British dwellings. In East Yorkshire Mr. Mortimer has shown that some so-called pit dwellings are really old iron-stone workings, etc., and in one instance he demonstrated that a series of pits were really the early stages of an entrenchment which had never been completed.

MOLES

Possibly on account of the difficulty of observation, the habits of the Mole have not been much studied by naturalists. Between the times of Aristotle and Le Court, who 'set up as a scientific mole-catcher in France about 1798,' little attention appears to have been paid to this animal. Le Court imparted his knowledge to Cadet de Vaux, who in 1803 published a small work on the subject, and these observations, particularly the more imaginative parts, have been copied and handed down by almost every subsequent writer. Mr. Lionel E. Adams has recently published ('Manchester Memoirs,' Vol. 47, No. 4, 1903) 'A Contribution to our Knowledge of the Mole (*Talpa europæa*)' which contains some very valuable information on the subject.

AND THEIR FORTRESSES.

Mr. Adams' method of studying the nature of the mole-hills was to carefully slice away the tops of the mounds with a spade until a run was visible. This was carefully followed and opened with the hands till it descended to a deeper level, when further slicing was necessary. As the work progressed plans were carefully made on paper, and whilst the author has secured about a hundred such plans, no two are exactly alike, though naturally they have a certain resemblance to each other. They show very simple and exceedingly complicated fortresses, but not one exactly resembling the time-honoured figure,

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originating from Geoffrey Saint Hilaire, elaborated by Blasius, 'and copied from him by every succeeding writer, apparently without the slightest attempt at verification.' By watching the erection of these structures from day to day Mr. Adams is of opinion that the galleries in the mounds are the natural, incidental, and inevitable outcome of the work of excavating

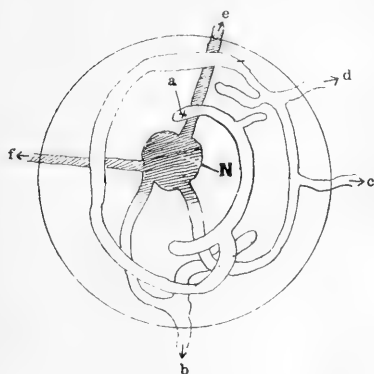


Fig. 1.

Plan of Complicated Fortress, with several Blind Terminals. *a* = Apex of tunnels. *b*, *c*, *d* = Outlets. *e*, *f* = Bolt-runs. *N* = Nest.

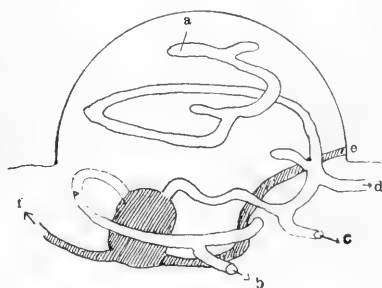


Fig. 2.

Elevation showing Spiral Gallery and Blind Terminals.

the nest-cavity and piling up the superincumbent mound. The two figures, kindly lent by the Council of the Manchester Society, represent a plan and elevation of one of the mounds, and exhibit the internal structure. Several similar illustrations accompany Mr. Adams' notes. The latter part of the 'Memoir' is devoted to 'Sexual Characteristics,' 'Enemies of the Mole,' 'Can the Mole See?' etc.

GEOLOGY.

Scottish Rocks in East Yorkshire.—The geological excursion to Kelsey Hill and Burstwick, after the annual meeting of the Yorkshire Naturalists' Union at Hull, was a great success, and several new and important facts were brought to light. Five or six boulders of the Trachytic rocks of South-eastern Scotland were found. This is the first record of the occurrence of these interesting rocks in England.—PERCY F. KENDALL, 21st December 1902.

THE YORKSHIRE BOULDER COMMITTEE AND ITS SIXTEENTH YEAR'S WORK, 1901-1902.

PERCY F. KENDALL, F.G.S., *Leeds, Chairman.*

AND

J. H. HOWARTH, F.G.S., *Halifax, Hon. Secretary.*

THE results of the work carried on during the year with undiminished energy all over the county are of exceptional interest.

Records which call for particular notice are the boulder of diabase at Aldfield, near Ripon (the most westerly point to which rocks foreign to the district have been traced) and the boulders of limestone at Escrick, which resemble some of the rocks of Swaledale. Carboniferous limestones rarely display characters by which their exact place of origin can be determined.

A visit paid by the Yorkshire Geological and Polytechnic Society to the Tweed Valley two years ago enabled members of the Yorkshire Boulder Committee to acquire a familiarity with some of the distinctive rocks of that region, with the result that the Haggis rock, so well known to Scottish geologists, is reported from several localities in the East of Yorkshire.

The interest of these observations is, however, eclipsed by a remarkable series of boulders noted by Mr. H. B. Muff, now of the Geological Survey of Scotland. Mr. Muff submitted to his colleagues, Messrs. B. N. Peach and E. H. Cunningham-Craig, a series of specimens of boulders from the country round Whitby, collected by Messrs. Muff and Sheppard, and among them were recognised rocks from the Southern Uplands of Scotland, such as Haggis rock, Queensbury grits, and radiolarian chert; Old Red Sandstone conglomerate of a Scottish type and various volcanic rocks of which the source may be in either the Cheviots, Pentlands, or Ochills. The authorities quoted consider that it is unsafe to assign porphyrites specifically to the Cheviots, as rocks of the same petrological character occur as far north as the Ochills. The succeeding determinations show that there is no improbability in this suggestion, for they include a large suite of quite distinctive Highland rocks, namely, Leny grits, Highland schists of Perthshire, Moine schists, and Ben Ledi grits.

Additional localities in Yorkshire are given for the Scandinavian rhomb porphyries, augite- and zircon-syenites, and the

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Secretary records a rock resembling the peculiar nodular gabbro of Imenæs, near Grimstad. A very satisfactory identification is that by Mr. Stather of a boulder absolutely identical in structure and constitution with the elæolite syenite (foyaite) of Kvelle, near Larvik.

Reported by W. GREGSON, F.G.S.

ALDFIELD. Five miles west of Ripon.

One diabase, 11 in. \times 7 in. \times 5 in. 600 feet O.D., on millstone grit; no angles.

Reported by P. F. KENDALL, F.G.S.

ESCRICK, NEAR YORK.

Several boulders of a Carboniferous limestone containing many Brachiopods have been found here, which are quite unlike anything I know in the Craven area. Mr. W. Horn, of Leyburn, says they are different from any limestone in Wensleydale, and suggests Swaledale as their place of origin. A single specimen had previously been submitted to me from the same locality of a yellowish, very crystalline limestone, which I recognised as identical in colour and structure with that forming the matrix of specimens of *Woodocrinus* from the famous quarry near Richmond. The corroboration is interesting, and may be valuable, as no distinctive Swaledale rock had previously been found in the Vale of York. The specimens were all found by Mr. E. M. Baines.

COXWOLD.

In a quarry beside Shandy Hall, and in digging foundations for a house a little nearer the village, the erratics consisted mainly of Carboniferous sandstone, limestone, and chert, with a few small boulders (up to about 8 inches in diameter) of Borrowdale andesite. A special search was made for Cheviot porphyrites, with negative results.

KILBURN.

At corner of a road quarter-mile south of the village, Borrowdale andesitic ash, containing many garnets. Roadside heap in the village, one Shap granite.

Reported by Rev. E. MAULE COLE, M.A., F.G.S.

CARNABY.

In digging a hole for a gate-post in the main street of the village, on highroad between Bridlington and Driffield, one Whin Sill, 22 in. \times 19 in. \times 12 in., polished and flat. The boulder now lies by the roadside, opposite the blacksmith's shop.

Reported by H. B. MUFF, B.Sc., F.G.S.

The following boulders from East Yorkshire have been identified by B. N. Peach, Esq., F.R.S., F.G.S., and E. H. Cunningham-Craig, Esq., B.A., F.G.S., of the Geological Survey of Scotland, to whom Mr. Muff submitted them.

ROBIN HOOD'S BAY.

Several beach boulders of andesites, porphyrites, and lamprophyres of Old Red Sandstone age from the Cheviot, Pentland, and Ochill Hills.

? Old Red Sandstone, Scotland. One specimen.

'Haggis' rock, northern edge of Southern Uplands of Scotland. One specimen in upper boulder clay.

Red jasper (radiolarian chert), Southern Uplands of Scotland. Beach boulder.

Leny grits, Highland schists, Perthshire. One specimen in beach boulder clay.

Epidiorite, Highland schists, Perthshire. One specimen, beach boulder.

Moine schist, Highlands. One specimen in upper boulder clay. WHITBY.

Lower Old Red Sandstone, Scotland. One specimen in lower boulder clay.

Ophitic dolerite (coarse) similar to the sills of Carboniferous age in the 'Midland Valley' of Scotland. One specimen, beach boulder.

STONEGATE, ESKDALE.

Queensbury grit, Southern Uplands of Scotland. One specimen.

Leny grits, ? One specimen.

EGTON BRICKWORKS, ESKDALE.

Ben Ledi grit, Highland schists, Perthshire. One specimen in boulder clay.

Most of these boulders have been sent to the Hull Municipal Museum.

Reported by HULL GEOLOGICAL SOCIETY.

BARTON-ON-HUMBER.

Quarry in glacial gravels, half-mile west of the village. Gravel consists mainly of local chalk and flint, but foreign rocks also occur as follows :—

Two coarse conglomerates, 18 in. diameter.

One glaciated basalt 18 in. ,,

One Cheviot porphyrite 12 in. ,,

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Amongst the smaller foreign pebbles, Cheviot porphyrites are the most common, but Magnesian Limestone (Roker type) greywackes, basalts, Carboniferous limestones, and Lias also occurred.

Reported by Rev. E. MAULE COLE, M.A., F.G.S.

DRIFFIELD.

In the Highfield Quarry, Rhomb-porphry.

Reported by G. W. B. MACTURK.

BLUESTONE BOTTOMS, NEAR LITTLE WEIGHTON.

In this Wold valley, at an elevation of 250 ft. above O.D., numbers of drift pebbles occur, Cheviot porphyrites being especially abundant.

Reported by JAS. FRASER ROBINSON.

WAWNE, NEAR HULL.

Pebbles of augite-syenite, Rhomb-porphry, basalt, greywacke, Cheviot porphyrite, black flint, and pink flint.

Reported by THOS. SHEPPARD, F.G.S.

EASINGTON, HOLDERNESS. On beach.

Shap granite, 8 in. \times 8 in. \times 8 in.

MEAUX, NEAR HULL.

Quartzite, 30 in. in diameter.

Pebbles of Rhomb-porphry, Cheviot porphyrite, Carboniferous sandstone, and Lias.

Reported by J. W. STATHER, F.G.S.

BURSTWICK, HOLDERNESS.

Foyaite (Brögger) Kvelle, 5 in. \times 4 in. \times 4 in.

DIMLINGTON, HOLDERNESS.

Zircon syenite, two small boulders.

Ångermanland granite, 10 in. \times 5 in. \times 5 in.

Coal Measure shale, with many Anthracosia, 6 in. \times 4 in. \times 2 in.

Pebble of chalk, with plate of *Mursupites ornatus* attached.

MIDDLETON-ON-THE-WOLDS.

In a gravel and sand pit at west end of the village, 150 feet O.D., occurs gravel consisting chiefly of water-worn chalk and flint pebbles, with a small percentage of foreign pebbles, including Rhomb-porphry, coarse red granite, basalts, ganister and grits, many Cheviot porphyrites, and Lias (Ammonites)

OUT NEWTON, HOLDERNESS COAST.

Shap granite, 3 ft. \times 2 ft. \times 2 ft.

WYKEHAM, VALE OF PICKERING.

In a sand-pit behind the Down Arms Hotel, a flint cast of *Ananchytes ovatus*.

Reported by F. F. WALTON, F.G.S.

ALDBROUGH, HOLDERNESS.

Haggis rock.

HAYBURN WYKE.

Haggis rock.

HORNSEA, HOLDERNESS.

Rhomb-porphry, with amygdulæ.

Shap granite, 18 in. \times 12 in. \times ?

Shap granite, 8 in. \times 5 in. \times 3 in.

Bedded volcanic ash, probably Borrowdale series.

Lower Silurian conglomerates, greywackes (Queensbury grits), etc.

Reported by Rev. GEORGE STYLE, M.A.

GIGGLESWICK.

On Grammar School Cricket Ground the pavilion is set back into a glacial moraine, containing numerous rounded to sub-angular stones. They include Millstone Grits, Yoredale grits and shales, Hardraw Scar limestone, Lower Carboniferous limestones, and Silurian grits.

NOTE.—This deposit and the worn rocks and roches-moutonnées from the School buildings on to the Settle Golf Links, by the Ebbing and Flowing Well, suggest an ice flow coming over Buck Ha' Brow. The moraine might, however, have been laid down by ice coming down Ribblesdale by Horton and Stainforth. Further evidence required.—J. H. H.

Reported by J. H. HOWARTH, F.G.S.

LANGCLIFFE, NEAR SETTLE.

In cutting for engine-bed at Mr. Christie's mills, by river Ribble, through about seven feet of top earth and drift with boulders, dark lower limestone *in situ* exposed; finely grooved and scratched, and very highly polished. Striæ down valley.

Reported by W. SIMPSON, F.G.S., AND J. H. HOWARTH, F.G.S.

MYTHOLMROYD, CALDER VALLEY.

In cutting for sewage drain by bridge over canal in village.

Deposit containing many rounded boulders and fewer sub-angular. One to two feet of top earth. Boulders in sand three to six feet. Shales *in situ* below.

Borrowdale ash, 4 in. \times 3 in. \times 2 in., and numbers smaller.

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Lake District andesites, a few small pebbles.

Eskdale granite, 6 in. \times 5 in. \times 2 in. and 3 in. \times 3 in. \times 2 in.

Ennerdale granophyre, 4 in. \times 3 in. \times 2 in.

Buttermere granophyre, pebble.

Rhyolite.

This deposit is on the opposite side of the river Calder to that reported previously by Messrs. Simpson and Law, and appears to be water-laid or re-sorted glacial *débris*.

HALIFAX, CALDER VALLEY.

In making a roadway and drains for developing Willow Hall Estate between Sowerby Bridge and King Cross, Halifax, on the east side of the Calder Valley.

575 ft. O.D. and 275 ft. above the river a deposit of clay plastered along valley side from three to ten feet thick, and lying on shales below the rough rock.

The lower portion a stiff, tenacious clay, almost stone free. The upper a sandy clay, containing well rounded to angular local rocks, varying in size from pebbles to three or four large sub-angular blocks, the largest being 60 in. \times 22 in. \times 11 in.

GRISTHORP.

On beach.

Gabbro, similar to Imenæs, South Norway.

Porphyrites (Cheviot type), abundant.

Red jasper, Southern Uplands of Scotland.

Quartz-porphyry.

ECONOMIC FUNGI.

SUPPLEMENTARY NOTE.

J. H. HOLLAND, F.L.S.,

The Museum, Kew.

It has been suggested that the divisions and figures in par. 3 of 'Economic Fungi' (*Naturalist*, February, p. 51) may not be sufficiently explicit, and that, perhaps, it would be better to give the number of all the species recorded by Saccardo to Vol. XVI., 1902, that is, the latest summing up. The figures would then be as follows:—52,157 species, comprised in 1,460 genera, under 60 orders. I had avoided reference to any order beyond Tuberaceæ, because after the Yeasts and certain Bacteria there are but few species of any economic value.

RINGING BEES.

EDWARD PEACOCK, F.S.A.,

Kirton-in-Lindsey.

THE custom of 'ringing bees'—that is, of beating kettles and pans at the time of swarming to induce them not to fly far away—is, I believe, common throughout Britain. It is generally regarded as mere folk-lore; I certainly have always considered it as such, though when I kept bees, which I did for many years, I was anxious to have the ceremony duly performed, for the same good and sufficient reasons as moved Mr. Jonathan Oldbuck to resent the weekly account with his baker being rendered in a book instead of by a tally ('The Antiquary,' Chap. XV.). Now I have changed my opinion, and come to the conclusion that our forefathers, in this as in so many other matters, were wiser than we, whose minds are so often clouded by pseudo-science. That bees are attracted by such sounds is, I think, proved by the following incident:—

It is here the custom at Christmas-time for the ringers of the Parish Church to go round to the houses in the neighbourhood ringing hand-bells. On the day after Christmas they visited the village of Northorpe, near Kirton-in-Lindsey. At one of the farmhouses there they stationed themselves near some hives of bees. We need hardly say the bees were quiescent—not one was to be seen—but the men had only rung a very short time when they 'puthered out' in great numbers, alighting on the music books and the money-box. The ringers were afraid of being 'tanged,' and, as one of them told me, promptly 'shedddled off' to a safer spot. I gather, however, from what they said that the insects were not angry, but had aroused themselves from their winter's rest to enjoy the concert. If a similar fact has been observed elsewhere, it would be well to have it recorded.

It is fair to add that I communicated the above facts to a lady who lives in Hampshire. She and a friend clanged a couple of bells close to the hives in the garden, but she tells me that not a single bee made its appearance.

FISHES.

Sturgeon at North Shields.—On Tuesday, 4th February, a Sturgeon (*Acipensor sturio*), 8½ feet in length and 154 lbs. in weight, was landed at the Corporation Fish Quay, North Shields, by the steam trawler *Rose*.—J. W. FAWCETT, Satley, Darlington.

Naturalist,

MOSSES AND HEPATICS OF BAUGH FELL.

WILLIAM INGHAM, B.A.,

York.

As there are no records of these plants for the district, it will be well to record all that were observed during the meeting of the Yorkshire Naturalists' Union to this fell on 2nd and 4th August 1902.

On 2nd August we drove to Rawthey Bridge through a pouring and persistent rain, which continued for the greater part of the day and much interfered with the success that would otherwise have been forthcoming. At Rawthey Bridge, about ten miles from our starting-point (Sedbergh), we left our conveyances, and began to walk for about three miles along the shoulder of Baugh Fell to Uldale Force, a trying walk, owing to the persistent rain, as the shoulder was very steep in many places. We soon came to an outcrop of the Upper Silurian rocks, forming the habitat of the following mosses:—*Grimmia apocarpa* Hedw.; *Racomitrium lanuginosum* Brid.; *Trichostomum tortuosum* Dixon, in large masses; *Zygodon viridissimus* Brown, on a tree; *Polytrichum piliferum* Schreb.; *Hypnum cupressiforme* var. *tectorum* Brid.; and *Hypnum Schreberi* Willd.

Not far away, the outcrop of Mountain Limestone rocks produced the following mosses:—*Dicranum scoparium* Hedw.; *Fissidens decipiens* DeNot.; *Barbula fallax* Hedw.; *Ditrichum flexicaule* Hpe.; *Tortula subulata* Hedw.; *Weisia rupestris* C.M., in abundant fruit; *Trichostomum tortuosum* Dixon; *Tortula intermedia* Berk.; *Barbula rubella* Mitt.; *Bryum capillare* L.; *B. pallens* Sw.; *Racomitrium lanuginosum* Brid.; *Mnium rostratum* Schrad.; *Orthotrichum anomalum* var. *saxatile* Milde; *Grimmia apocarpa* Hedw.; *Encalypta streptocarpa* Hedw.; *Bartramia Cederi* Sw., c.fr.; *Philonotis fontana* Brid.; *Neckera crispa* var. *falcata* Boul., in large silvery masses, with stems curving upwards and looking much like a large hepatic; *Isotheceum myurum* Brid.; *Eurhynchium striatum* B.&S.; *Hypnum moluscum* Hedw., in large patches on the dry rocks; *Hypnum cupressiforme* L., a frequent moss on these rocks; *Eurhynchium praelongum* B.&S. and *E. Swartzii* Hobk.; associated with the *Bartramia Cederi* Sw. is the rare hepatic *Scapania aspera* Müll. et Bern., of delicate green colour.

Close by these rocks grows *Polytrichum alpinum* L., and, twining round its stems is the very filiform-stemmed hepatic *Lepidozia Pearsoni* Spruce, a new hepatic for Yorkshire. On

the slope of Baugh Fell, about a mile beyond the rocks, are the hepatics *Mylia Taylora* Hook.; *Jungermania riparia* Tayl.; *J. Flærkii* Web. et Mohr; *Aneura pinguis* L.; *Diplophyllum albicans* L.; *Plagiochila asplenoides* L.; and *Metzgeria pubescens* Schrank. Here also we find *Leucobryum glaucum* Schimp., and the following interesting bog mosses:—*Sphagnum subnitens* var. *flavescens* Warnst.; *S. recurvum* var. *amblyphyllum* Warnst. and var. *mucronatum* Warnst.; and *S. papillosum* Lindb. var. *sub-læve* Limpr.; but the most interesting bog-moss is *S. parvifolium* Warnst., a new record for Yorkshire; Mr. Horrell has found this *Sphagnum* on Widdy Bank, Teesdale. On this boggy ground grow the mosses *Hypnum fluitans* var. *falcatum*; *H. intermedium* Lindb.; *H. falcatum* Brid.; *H. stramineum* Dicks.; *H. ochraceum* Turn.; *H. palustre* L.; and a dark slender state of *Philonotis fontana* Brid.

At this point Mr. Hugh Richardson pointed out the large green masses of the calcicolous moss, *Hypnum commutatum* Hedw., growing by the river side, its near ally *H. falcatum* growing higher up among the bog mosses. Mr. Pickard also brought from the top of the fell a fine fruiting specimen of the moss *Polytrichum strictum* Banks, with cubical capsules. On drier ground and rocks grow *Barbula rigidula* Mitt. with abundance of its characteristic gemmæ, like minute bunches of grapes, a good mark of distinction from its near allies; *Tortula muralis* Hedw.; the Apple Moss, *Bartramia pomiformis* Hedw.; *Dicranum scoparium* Hedw.; *Polytrichum piliferum* Schreb. and *P. formosum* Hedw.; *Hylocomium splendens* B.&S.; *H. squarrosum* B.&S.; and *Hypnum Schreberi* Willd.; and another hepatic, *Scapania undulata* L. with quite entire leaves.

Nestling on the sandy rock ledges above the Uldale Force is the glossy moss, *Plagiothecium depressum* Dixon.

Crossing over the moor to Taith's Gill we have a continuance of some of the mosses already mentioned, as *Weisia rupestris* C.M.; *Fissidens decipiens* DeNot.; and *Hypnum Schreberi* Willd., but new ones make their appearance in this wonderful gill, viz.:—*Plagiobryum Zierii* Lindb.; the vivid green moss *Anæctangium compactum* Schwg.; *Brachythecium rutabulum* B.&S.; and *Hypnum falcatum* var. *gracilescens* Schimp.

Members who were present will remember the huge scooped-out depression by the side of Taith's Gill, close by the 'intrusive dykes of plutonic rocks,' and just as we emerged from our difficult walk along the side of this marvellous gill. At this point occurs a *Bryum* that has at present to come under *B.*

inclinatum Bland, as the specimen brought away was too small to pursue the matter further. Mr. Dixon thinks it is a new *Bryum*, and more of it should be found, so as to name it correctly. In this same place grows the rare *Sphagnum Gravelii* Warnst., associated with *Sphagnum cymbifolium* var. *fuscorubescens* Warnst. Three hepatics occur here, viz.:—*Jungermania incisa* Schrad.; *J. riparia* Tayl., and *Nardia scalaris* Schrad.; also a harpidioid moss, *Hypnum fluitans* var. *Jean-bernati* Ren.

On the second day, 4th August, we went by conveyance along the Cautley Road to Cross Haw Beck, where we dismounted, and then followed the beck to its source. The most interesting moss met with was *Trichostomum crispulum* var. *elatum* Schimp. (teste H. N. Dixon), and the most interesting hepatic was *Lejeunea serpyllifolia* var. *planiuscula* Lindb., both occurring near the source of the beck. Other mosses of this beck are:—*Fissidens viridulus* Wahl. c.fr.; *Barbula fallax* Hedw., in large patches; *Tortula subulata* Hedw.; *Campylopus flexuosus* Brid.; *Weisia rupestris* C.M.; *W. verticillata* Brid.; *W. crispata* C.M.; *Ulota Bruchii* Hornsch.; *Grimmia apocarpa* Hedw.; *Trichostomum tortuosum* Dixon; *Philonotis calcarea* Schimp., of fine, tall growth; *Racomitrium aciculare* Brid., a very tall growth; *Fissidens bryoides* Hedw.; *Porotrichum alopecurum* Mitt.; *Homalia trichomanoides* Brid.; *Heterocladium heteropterum* B.&S.; *Eurhynchium piliferum* B.&S.; *E. prælongum* B.&S.; *E. confertum* Milde.; *E. murale* var. *julaceum* Schimp. c.fr., a beautiful moss, growing on wet clay; *Amblystegium filicinum* DeNot.; *Brachythecium rutabulum* B.&S.; *B. plumosum* B.&S.; *Hypnum commutatum* Hedw.; *H. cupressiforme* L.; *H. palustre* L.; *H. molluscum* Hedw.; *H. cuspidatum* L.; *H. intermedium* Lindb.; and *Hylocomium loreum* B.&S. Other hepatics besides the one above are *Jungermania ventricosa* Dicks.; *Frullania dilatata* L.; *Plagiochila asplenoides* L.; *Scapania purpurascens* Hook.; and *Metzgeria furcata* L. By the side of Upper Cross Haw Beck are deep masses of the Bog-Moss, *Sphagnum acutifolium* var. *flavo-rubellum* Warnst.

Leaving this stream, we walked over to the very interesting Hebblethwaite Hall Beck, which is very rich in mosses and hepatics, but the time was too short to explore much of it. The interesting mosses here are:—*Eurhynchium Teesdalei* Schimp., in fruit; *E. pumillum* Schimp.; and *Plagiothecium depressum* Dixon, with nerve almost obsolete, all occurring on the wet entrance of the cave. Here also grows a delicate, rather distant-leaved form of the hepatic, *Scapania aspera* Müll et Bern., which is evidently derived from a fine growth of this

Scapania higher up the stream ; so fine, in fact, that I gathered it for the common *Scapania undulata* L.

The other mosses of this beck are :—*Dichodontium pellucidum* Schimp.; *Fissidens decipiens* DeNot., handed down to me by Mr. Morris from the upper rocks, and also found by myself on the lower rocks ; *Barbula cylindrica* Schimp., and another specimen, found in fruit (which is rare), by Mr. Pickard ; *B. rigidula* Mitt. ; *B. tophacea* Mitt., found by Mr. Pickard ; *B. Spadicea* Mitt. ; *Tortula subulata* Hedw. ; *T. intermedia* Berk. ; *Fissidens adiontoides* Hedw., at the mouth of the cave ; *Weisia verticillata* Brid. ; *Grimmia apocarpa* Hedw. ; *G. apocarpa* var. *pumila* Schimp. (teste H. N. Dixon) ; *G. apocarpa* var. *gracilis* W.&M. and another slender form ; *Trichostomum mutabile* Bruch., very near var. *littorale* Dixon (teste H. N. Dixon) ; *T. tortuosum* Dixon ; *Porotrichum alopecurum* Mitt. ; *Mnium rostratum* Schrad. ; *Anomodon viticulosus* H.&T. ; *Bryum pseudo-triquetrum* Schwgr., in large, deep masses near the cave ; *Neckera crispa* Hedw. ; *Mnium punctatum* L. ; *Eurhynchium Swartzii* Hobk., a small yellow form ; *E. piliferum* B.&S. ; *E. striatum* B.&S. ; *Amblystegium filicinum* DeNot. ; *Hypnum commutatum* Hedw. ; *H. molluscum* Hedw. ; *H. palustre* L.

The hepatics of this beck, in addition to the *Scapania aspera* above, are *Jungermania riparia* Tayl. ; *Porella platyphylla* L. ; *Plagiochila asplenoides* L. ; *Jungermania ventricosa* Dicks. ; *Metzgeria pubescens* Schrank. ; and *Conocephalus conicus* L.

Crossing over to Dove Cote Cave, we found the large stones at the exit covered with vivid green masses of *Brachythecium rutabulum* B.&S. Lower down, the side of Danny Bridge is covered with masses of *Hypnum molluscum* Hedw., in fruit.

Along the Clough River was found an interesting moss, *Swartzia montana* var. *compacta* (Hueben), teste H. N. Dixon ; exactly like the figure in Braithwaite's 'British Moss Flora,' and recorded in that book from Ben Lawers. Other mosses by this river are :—*Trichostomum tortuosum* Dixon ; *Barbula cylindrica* Schimp. ; and *Weisia rupestris* var. *compacta* Schimp.

This completes the mosses and hepatics found in this short tour of two days. The moss and hepatic flora of Baugh Fell is undoubtedly interesting, quite as much so to the bryologist, as the wonderful rock formation is to the geologist.

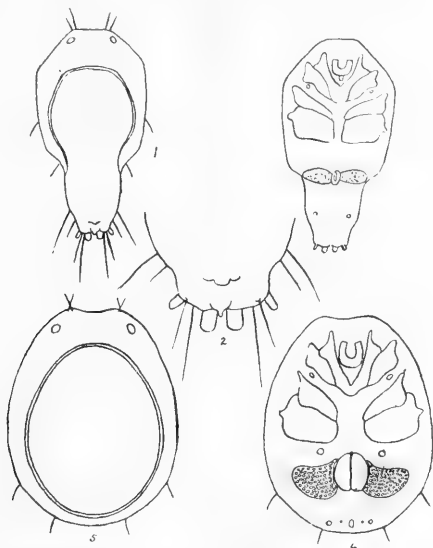
The moss, *Weisia rupestris*, rock-loving, as the specific name denotes, is the characteristic moss of these becks, occurring in almost every nook of the rocks, and invariably fruiting.

The hepatic, *Jungermania riparia*, is the characteristic one of this beautiful order of plants. These becks are richer in these two than even Teesdale and Weardale.

LINCOLNSHIRE FRESHWATER MITES.

C. F. GEORGE, M.R.C.S.,
Kirton-in-Lindsey, Lincolnshire.

Arrhenurus membranator, Sig. Thor. This singular-looking mite has been discovered since the publication of Dr. Piersig's important work on the Hydrachnidæ, which purports to describe all the known species of Freshwater Mites in the world up to June 1901. It is figured and described by Dr. Sig. Thor in the *Zoologische Anzeiger*, No. 657-8, vom 25, November 1901. Place of discovery, Hemnæs, Smaalenene, in Norway. On 11th July



***Arrhenurus membranator*.** 1, upper; 3, under surface of male; 2, end of tail;
 4, under; 5, upper surface of female.

1902, whilst visiting with my brother at North Thoresby (between Grimsby and Louth, Lincolnshire), I took two specimens, a male and a female. Sig. Thor does not mention the female, from which I gather he has not met with that sex. I am, therefore, fortunate in being able to give a figure, as probably no drawing or description has been previously published. Fig. 1 represents the upper and Fig. 3 the under surface of the male mite; the legs are not figured, they are of the usual type, and the fourth internode of the fourth leg carries the peculiar spur found on so many of the males of this family.

It will be seen by the figures that the general shape of the creature is very much like several other species of *Arrhenurus*, and Sig. Thor remarks that it belongs to the division '*Megalurus*' of Carl Thon, of Prague. It is easily distinguished from all other known species by the four rather long and very remarkable projections at the end of the tail. I suppose the appearance of these appendages suggested the name '*membranator*.' Fig. 2 represents the end of the tail more highly magnified than the Figs. 1 and 3.

The general colour of the mite is like yellowish parchment; any other colour of the integument is soon discharged when the mite is placed in preservative solution.

Fig. 4 represents the under and Fig. 5 the upper surface of the female. The perforated plates on the under side (one on each side of the genital valves) are rather peculiar in shape, and very nearly resemble those figured by^s Dr. Piersig as *A. conicus*. The upper surface has the circular depressed line common to all female members of this family.

I am indebted to Mr. Soar for the figures, which he made from my specimens, also for measurements of the mites, viz.: Length of male, 1.32 mm.; breadth of male, 0.80 mm. These differ slightly from Sig. Thor's, who gives length, 1.15 mm.; breadth, 0.80 mm. Length of female, 1.36 mm.; width of female, 1.16 mm.; length of legs of male: 1st, 1.04 mm.; second, 0.96 mm.; third, 1.04 mm.; fourth, 1.20 mm. Sig. Thor gives the length of the appendage, 0.38 mm.

NORTH LANCASHIRE BOTANICAL NOTES IN 1902.

S. LISTER PETTY.
Ulverston.

THE following notes on North Lancashire plants have been made this year with one exception—*Cotyledon*—at Newland, where I have known it for several years; one spike was nearly nine inches long. It is in the possession of the Rev. W. Wright Mason, of Bootle, Liverpool. Lake Bank is at the foot of Coniston Lake, where the gondola pier stands.

***Clematis Vitalba* L.** At the highroad end of Birk Row bridge, over the Crake (i.e., between Lowick Bridge and Nibthwaite). There is none of it about the farm hedges or walls, and nothing to indicate how introduced. New locality.

Ranunculus pseudo-reptans. Margin of Windermere from just below Storrs, the county boundary, to near Blake Holme. I do not remember any record of the plant from this side of the Lake, i.e., the Cartmel portion.

Nymphæa lutea L. In Beacon Tarn (say 535 ft.). The plants grow too far from the shore to gather, but I was told it was this. In Allen Tarn, foot of Coniston Lake, with *Castalia*.

Radiola linoides Roth. On the roadside, and on the fell above, between Lake Bank Hotel and Brown How. Miss Beever only gives 'Coniston.'

Impatiens noli-me-tangere L. Bank of Foundry Beck, Lowick, near the bridge.

Trifolium striatum L. Walney Island, 1902, Miss L. Burton. A new record for Walney.

****Vicia sepium*** L. var. ***alba*** Gray. Roadside, Arrad Foot to Greenodd. Mr. Arthur Bennett named the specimen and another gentleman concurred. A third called it the following.

****Vicia sepium*** L. var. ***ochroleuca*** Batard. On roadside below Bell Wood, between Lowick Bridge and Nibthwaite Grange. Named by Mr. Bennett. Neither of these varieties is on record for V.C. 69.

Cotyledon umbilicus L. On a wall at Newland, near Ulverston. On rocks bordering railway near Haverthwaite. One plant on wall near a cottage, Beech Hill Hotel and Storrs; perhaps planted there.

Centaurea nigra L. var.? ***dicipiens*** Thuill. Miss Hodgson mentions a form approaching this. I found on the roadside between Foxfield and Wrecks a form of *nigra* which *almost* fits the E.B. (ed. 3) figure DCCVII. in foliage and flower.

Centaurea Scabiosa L. Railway embankment between Ulverston and Lindal (26th June).

****Euphrasia nemorosa*** H.Mart. On the roadside and on the fell above road, between Water Yeat and Greenholm Farm. Unrecorded so far as I know. Named by Mr. Arthur Bennett.

Euphrasia gracilis Fr. Roadside between Water Yeat and Lake Bank. Named by Mr. Bennett.

Lycopus europæus L. Side of Windermere, below Beech Hill Hotel. Not on record for the Cartmel side of Windermere.

**Melissa officinalis* L. Alien. In a field a few hundred yards away from the cottages at Newland, near Ulverston. An old escape?

Dr. R. H. Beardsley, of Grange, has kindly allowed me to include the following from a list of the late Dr. Amos Beardsley, F.L.S., etc. :—

Lathræa Squamaria L. Hampsfell, Lancs. ; Whitbarrow, Westm.

Daphne Laureola L. Grange, 1882.

My thanks are due to Mr. Arthur Bennett for his kindness in naming specimens.

REVIEWS AND BOOK NOTICES.

The Birds of Bempton Cliffs. By E. W. Wade. A. Brown and Sons, Hull. Price 2s. net.

In this pamphlet the author gives a concise and most interesting history of the birds of the famous Bempton, or, as they are best known to the outside world, Flamborough cliffs, and he performs his task in a masterly fashion as one who has had a long experience of the subjects he loves to write upon.

He first deals with the scenery of the locality, than which there is no grander feature on the whole of the east coast; he then dilates on the threatened depopulation of the breeding places by indiscriminate slaughter, which was, happily, put an end to by the Wild Birds' Protection Acts; next follows a description of the different species of birds that frequent the chalk cliffs, and full details of the life and economy of the Guillemot, which is, needless to state, *the* bird of Bempton. In dealing with this matter, as the author is an expert climber himself, he is enabled to give many facts at first hand, but in addition, he has had the privilege of drawing upon old 'Ned' Hodgson's vast store of reminiscences.

When Mr. Wade first visited the place the eggs of the Guillemot were not in great request: some of the best specimens might have been purchased for a few pence, but nowadays the increased interest taken in oology has caused a corresponding increase in the demand for varieties; naturalists from all parts of the kingdom come to see the 'climbers,' and prices have accordingly risen: as much as five shillings, seven and sixpence, and even, in exceptional cases, half-a-sovereign being paid for 'fancy coloured' eggs.

It would not be doing justice to the author were I to quote

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the paragraphs of greatest value to naturalists, and for these the reader is referred to the pamphlet itself, which concludes with particulars concerning the practice of 'climbing' as followed at the Yorkshire cliffs. As already stated, Mr. Wade is an accomplished cragsman himself. I have seen him 'ower cliff' with, and without, ropes. In the latter case his sure-footedness reminded me of a chamois, and, on one occasion, when I wished to descend to a ledge at the bottom of a little sloping path, and suggested that a rope round my waist would be an advantage, I was met by the remark from 'Old Ned': 'Wy! Mr. Wade wad hop down theer!' so that it must have been some extra-



Guillemots on Hateley Shoot.

ordinary feat of daring which caused the same 'Old Ned' to shake his stick and exclaim, 'Eh! A'd a mahnd te warm yer' (p. 18).

As regards the illustrations, which are from photographs taken by the author, perhaps the best are those of Guillemots on Hateley Shoot (one of which is reproduced herewith), but, where all are excellent, it is difficult to institute comparisons.

Mr. Wade's notes were read to the Hull Scientific and Field Naturalists' Club, and the pamphlet is issued by that society.

T. H. N.

Manningham Park and its Trees. Compiled by members of the Bradford Scientific Association and the Bradford Natural History and Microscopical Society. 1903. 32 pp.

The Bradford Societies are to be congratulated on their idea of publishing an account of the trees of Manningham Park. This pamphlet, issued at 1d., gives an account of some twenty-three species growing in the park. Botanically the pamphlet is very weak, and there is a lack of uniformity of treatment. No attempt has been made to indicate the seasonal aspect of the trees, and the points of special interest are conspicuous by their absence. We understand that the first edition of 2,000 copies was exhausted early in December last, though the pamphlet is dated 1903. Its ready sale indicates clearly a demand for such a work, and with more care and labour expended on a new edition, a very valuable work might be done in arousing an interest in the natural history of trees. The poverty of the park in species is remarkable, and efforts should be made to secure many interesting additions. The idea is well worth adopting in all our large towns, the parks of which contain in many cases interesting collections. A good and reliable account would serve as an excellent guide to teachers and scholars alike interested in nature study. Its value would be enhanced by adding a list of reference books in the Free Library, where further details could be found. In this connection it would be more useful to follow a standard Flora than the 'London Catalogue.'



European Fungus Flora: Agaricaceæ. G. Massee, F.L.S., etc., Royal Gardens, Kew. (Duckworth & Co.)

Since the appearance of Cooke and Quelet's 'Clavis Synoptica Hymenomycetum Europæorum' (1878), no further book of so handy a nature dealing with the Fungus Flora of Europe has been at the call of British Mycologists until this one made its welcome appearance. The present volume treats only of the gill-bearing fungi: the Agaricaceæ. It brings all the European species together within a very small compass. The descriptions are clear and concise, and embrace the most marked specific characters in each case; they occupy from two to four lines only, and thus enable the 2,750 species to be described on less than 250 pages (The abbreviations employed are self-explanatory.) 1,553 are stated to be British. Non-British species are indicated by being placed within brackets. One great boon to the student will be that he can see at a glance, under any

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genus, what European species are still unknown in this country, and where they fit in among ours. If the last ten years' accumulation of new British Agarics had been indicated by an asterisk it would have formed an acceptable addition to the value of the book; of course, these may be found by those who care to collate the present work with Massee's Brit. Fung. Flo. 1892-95.

There is a valuable synopsis at the head of each group, and each genus is further broken up into sections, which facilitates the tracking down of species.

The book represents an enormous amount of labour entailed in extracting from the general descriptions the most pronounced and constant features of each species.

The sequence of genera is rather odd; for instance, *Russula* looks peculiar between *Tricholoma* and *Mycena*; and *Marasmius*, *Lactarius*, and *Hygrophorus* between *Collybia* and *Clitocybe*. There may be some justification for it, but we must confess we do not know of any. However, all the European genera and species are there, fully represented, and that is the primary object of the work.

The printing and general get-up of the book is good; it is light, easily keeps open, and is as suitable in the field as at the work-table. It can be safely recommended to every Mycological student. The printers and proof-readers have had their eyes about them. An hour's special search failed to detect any misprints. There is a slip of the pen at line 22, p. 245, where 'specific' has been written instead of 'generic.' The index is all that can be desired. The price of the work (6s.) is very reasonable.

C. C.



'First Book of Forestry.' By Filibert Roth (Chief of the Division of Forestry, U.S. Department of Forest Reserves), 98 figures. 1902. Ginn and Co. (London and Boston). 3s. 6d. This book is written in a style both refreshing and suggestive of the woods. It is very different from any books dealing with forestry in Britain, and there is little of the formal, statistical, German method so evident in most of our text-books. The book is probably too general to satisfy any examination in forestry, but, as the preface explains, this is not intended. It is evidently written as an aid to Nature study, but in this direction it is essentially a book for the teacher or senior pupils. We have seen no book more likely to stimulate an interest in trees in a youth who was already somewhat familiar with them. It is unfortunately too American in its references to be quite as useful in Britain as it might. Yet it sets forth in an apt and pleasing way the general principles of forestry, which are much the same all the world over. Most of the numerous illustrations are from photographs of forest of various kinds and in various conditions. They greatly add to the value of the book, not only for those interested in forestry, but for anyone desirous to learn about the vegetation of the United States.—W. G. S.

With the January number the well-known *Naturalists' Journal* changed its title to that of *Nature Study*, in order to keep pace with the times. The contents are likely to prove of service to teachers and others interested in this work.

'British Cephalopoda: Their Nomenclature and Classification,' by W. E. Hoyle, M.A., is the title of 'Notes from the Manchester Museum,' No. 9. It contains a useful 'Key for the Determination of British Cephalopoda.' The pamphlet is a reprint of Mr. Hoyle's paper in the *Journal of Conchology*, Vol. 10, No. 7.

'A Glossary of Popular, Local, and Old-fashioned Names of British Birds,' by C. Louis Hett (1902), is published by Messrs. H. Sotheran & Co., for one shilling. It is a useful pamphlet of 114 pp., and of suitable size for the pocket. It is in three sections, the first being a list of birds accepted as British by a committee of the British Ornithological Union in 1883; the second is this list arranged in alphabetical order; and third, a glossary of synonyms.

'Lake-Country Rambles.' By William T. Palmer. London: Chatto and Windus. 1902. 6s. This book appeals more to the tourist, or the individual anxious to 'do' the Lake District during his summer holiday, than to the Naturalist. Still, it contains points of interest to the student of Nature, particularly in the chapters on 'A Summer Fox-hunt,' 'Badger Ways,' and 'After Otter,' though the keen 'sporting' element throughout the book betrays the author's acquaintance with mammal, bird, and fish to vary according to the relative amount of sport they afford. Having passed all his life within measurable distance of the fells, he is thoroughly acquainted with them, and with their inhabitants, and his information is imparted in a pleasant style, though the prominent part played by the author in the various rambles and expeditions is a little irritating to the reader. The book contains thirty chapters, most of which have previously appeared in various magazines and journals, and a fine view of the Napes Needle forms the frontispiece.

The City of Manchester is well blessed with scientific societies of various sorts. Publications from three of these have recently been received.

The first is the 'Annual Report and Transactions of the Manchester Microscopical Society,' a carefully edited and attractive-looking volume. This contains many most interesting papers, some of which are illustrated by admirable plates. It is a pity that none of them have any bearing upon the district around Manchester.

The 'Memoirs and Proceedings of the Manchester Literary and Philosophical Society' are well known for their scientific value. Part 6 of Vol. 46 has just been issued, and, like the publication above, is sold for 1s. 6d. Like it, also, it unfortunately contains little of interest to South Lancashire beyond the fact that the papers are by local men.

The 'Report and Proceedings of the Manchester Field Naturalists' and Archæologists' Society for 1901' is not of much interest or value to anyone but the members of the Society—if to them. Judging from the balance sheet, too much attention appears to be devoted to soirées, teas, and other social functions. With an annual income of £115 (about all of which is expended), something more might surely be accomplished in the matter of publications; and advertisements relating to cycles, boots, millinery, and watches be dispensed with. No papers or scientific notes are published, but about sixty pages are devoted to accounts of 'pleasant excursions,' presumably all written by the editor, whose name appears rather frequently throughout. Some of these reports are illustrated by blocks lent by hotel proprietors, etc.!

FIELD NOTES.

MAMMALS.

Seal at Yarm, Yorkshire.—A Seal was seen in the Tees, as high as Yarm, last week. It was shot, but sank and was lost.—T. H. NELSON, Redcar, 2nd February 1903.

Seal at Seaton Sluice. A specimen of the Common Seal (*Phoca vitulina*) was caught on the beach at Seaton Sluice, Northumberland, on Friday, 28th November 1902, by a couple of miners.—J. W. FAWCETT, Satley, Darlington.

Seal at Bamburgh.—On Sunday, 30th November 1902, a fine specimen of the Common Seal (*Phoca vitulina*) was caught on the beach at Bamburgh, Northumberland, where it had been left by the receding tide, by Mr. J. Atkinson, of Armstrong Cottages, near that town.—J. W. FAWCETT, Satley, Darlington.

Seal at Seaham Harbour.—On 2nd February 1902, a Silver-ringed Seal (*Phoca vitulina*) was caught on the beach at Foxhole Dene, near Seaham Harbour, by Messrs. Fred. Palmer, of the Lord Seaham Hotel, and John Stoddart. It could not free itself from the broken water and was thrown inshore, where it was caught after a determined resistance.—J. W. FAWCETT, Satley, Darlington.

Badger near Spilsby.—I am sorry to say that a Badger (*Meles meles*) has recently been killed at Old Bolingbroke, near Spilsby. The destruction of these animals, comparatively harmless, and useful to the fox-hunter, is much to be regretted.—J. CONWAY WALTER, Langton Rectory, 15th January 1903.

Badgers near Ripon.—Two Badgers were captured in traps in this neighbourhood last year. One, which was scarcely at all injured, was sent to the Belle Vue Gardens, Manchester, alive, and the other has been stuffed by a keeper here.—R. A. SUMMERFIELD, North Stainley Vicarage, 22nd January 1903.

Otter in the Wear.—On Saturday, 24th May 1902, a large Otter (*Lutra lutra*) was seen in the river Wear, near Framwellgate Bridge, in the City of Durham. During the middle of the July following Otters were frequently seen in the Wear near Stanhope, and were proving troublesome to the fish in that portion of the river, several Trout having been picked up with pieces bitten out behind the head. Similar ravages also took place in the following October.—J. W. FAWCETT, Satley, Darlington.

Otter at Warkworth, Northumberland.—A fine male Otter (*Lutra lutra*) was killed by the otter hounds near Barnhill, Warkworth, on 1st July 1902.—J. W. FAWCETT, Satley, Darlington.

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BIRDS.

Eider Duck in Durham.—An eider duck (*Somateria mollissima*) was shot on the Wear at Stanhope on Friday, 22nd August 1902. It is only a casual visitant to the county of Durham.—J. W. FAWCETT, Satley, Darlington.

Kingfisher at Ripon.—It is interesting to note that during the summer and autumn a Kingfisher frequented the Canal basin, in the City of Ripon, and was frequently seen, by my son, fishing there, though there are roads and houses on each side and a noisy timber yard at the end.—R. A. SUMMERFIELD, North Stainley Vicarage, 22nd January 1903.

Golden Eagle in Upper Wharfedale.—I visited Kettlewell on 17th November, and found on my arrival that a large bird, which turned out to be a young Eagle, had just been taken by the keeper. The unfortunate bird had been caught in a trap, which it had succeeded in carrying away, but as this impeded its flight the bird was soon despatched by the keeper. Mr. B. Pickering, of Bradford, who has examined the bird, states that it is a male Golden Eagle (*Aquila chrysaëtus*) about two years old. I have not heard of the capture of one of these birds in this neighbourhood for many years.—W. A. SHUFFREY, Arncliffe Vicarage, Skipton.

[Mr. R. Butterfield has also favoured us with a note confirming the record.—EDS.]

Great Spotted Woodpecker near Middlesbrough.—By the *Northern Weekly Gazette* for 11th January 1902 I see that a mature male Great Spotted Woodpecker (one of a pair) had been trapped close to the Albert Park, by means of a horse-hair noose placed at the entrance of its sleeping quarters, on or about 27th December 1901. It seems a great pity that such despicable destroyers of rarer birds cannot be severely punished. As some of these individuals are members of Naturalists' Field Clubs, it would be well if those members of such who have national interests at heart would take steps to have such characters expelled from their lists of members. Some of the worst destroyers of rarer birds and plants are members of Field Clubs, under which they shelter their detestable actions.—J. W. FAWCETT, Satley, Darlington, 27th January 1902.

Bittern, etc., in Lincolnshire.—On 12th November Mr. Hall shot a Long-tailed Duck (*Harelda glacialis*), on 26th November two young Eider Drakes (*Somateria mollissima*), and on 5th December a Great Shearwater (*Puffinus major*), all on the Kirton Marshes; on 30th November a Bittern (*Botaurus stellaris*) was shot on Washingborough Fen, in spite of its being on the protected list.—F. M. BURTON.

Albino Birds in Yorkshire.—A white Starling (*Sturnus vulgaris*, L.) was seen at Weaverthorpe, Yorkshire, during the summer of 1901; a white Blackbird (*Turdus merula*, L.) was observed at Hemingborough during the winter of 1901; a white Linnet (*Linota cannabina*, L.) was seen at Buckton, Yorkshire, during the winter of 1898. It was amongst a flock of the same species.—W. HEWETT, York, 6th January 1903.

Fight between a Heron and Peewits in Durham.

One day in the third week of June 1902 a curious sight was witnessed in Bollithope, in Weardale, when four Lapwings or Peewits (*Vanellus vanellus*) attacked a Heron (*Ardea cinerea*) in mid-air. The Lapwings made vigorous attacks on the Heron, which, however, proved futile, and after receiving a few hard knocks they were glad to let their opponent alone.—J. W. FAWCETT, Satley, Darlington.

Rough-legged Buzzard, etc., in Lincolnshire.—A fine Rough-legged Buzzard (*Butea lagopus*) was shot in December at Eastville, near Boston. The recent rains seem to have brought more Woodcock than usual. On 7th January I put up a brace together, and a third not many yards away, in a short walk in Ostler's Plantations, near the Tower on the Moor, Woodhall Spa. Owing to the very mild season, few wild fowl have been seen. On 8th December three couples of wild duck passed over, flying northward. On 12th September, with a bitter east wind, eight wild geese passed over me, on their way, apparently, to the Trent. This, before harvest was finished, was very unusual.—J. CONWAY WALTERS, Langton Rectory, 15th January, 1903.



REPTILES.

Ringed Snake at Durham.—At the October quarterly meeting of the Durham County Naturalists' Union (4th October, 1902) a couple of specimens of the Ringed Snake (*Tropidonotus natrix*) which had been caught a short time previously in Pelaw Woods, near Durham, were exhibited by Mr. Alfred Brock, of Durham.—J. W. FAWCETT, Satley, Darlington.

LEPIDOPTERA.

Poplar Hawkmoth in Durham.—In June 1902 a fine specimen of the Poplar Hawkmoth (*Smerinthus populi*) was caught near Greenside, in the parish of Ryton, in the county of Durham.—J. W. FAWCETT, Satley, Darlington.

Poplar Hawkmoth in Northumberland.—The month of June 1902 was a plentiful one for the Poplar Hawkmoth in various parts of Northumberland, and remarkably fine specimens were caught at Corbridge on 14th June, and at Cornhill School-house, Cornhill-on-Tweed, on 17th June, by Mr. R. Hall.—J. W. FAWCETT, Satley, Darlington.

Lepidoptera New to Cleveland Taken in 1902.—*Cymatophora flavicornis*, taken at Carlton-in-Cleveland in April; *Hypsipeetes ruberata*, bred from larvæ taken at Great Ayton; *Cucullia chamomillæ*, taken at rest on fence at Great Ayton, 31st May; *Larentia filigrammaria*, bred from larvæ taken at Ginsborough; *Cheimatobia boreata*, common among Birch at Kildale in November.—T. ASHTON LOFTHOUSE, Middlesbrough, 12th January 1903.

COLEOPTERA.

***Cionus scrophulariæ* in Westmorland.**—No doubt *Cionus scrophulariæ* is pretty widely distributed. Dr. Johnson, of Grasmere, brought me on 5th June 1901 specimens of the perfect insect, which was abundant on the Mullein plant (*Verbascum Thapsus*) in his garden. Examining our own garden plants, it was found to be numerous there too, resorting to the lower parts of the large woolly leaves. The beetles were pairing, and soon disappeared. Mr. Wallis Kew's interesting paper apprised me of the earlier life-history of this weevil, and last year I looked out for it in the garden. Nothing was seen of it, however, till 24th June, when again the perfect insects were found on the Mullein plant which stands on the bank of the river Rothay. But on 28th July, when gathering flowers a quarter-mile higher up stream, we came across Figwort (*Scrophularia nodosa*) greatly infested by it, the feeding snail-like grub and the larva being present. Are there, then, since Mr. Wallis Kew says that the imago emerges in some ten days from the cocoon, two generations of this beetle in the summer? And does it always resort to another plant when perfected? I should say that there may be Figwort plants nearer to our garden Mullein than those found infested.—MARY L. ARMITT, Rydal.

NORTHERN NEWS.

The Halifax Corporation has planted fifty acres of land with young Ash, Larch, Sycamore, and Pine.

Mr. J. E. Clark contributes an article on 'Lake Pickering' to *The Friend* for January, illustrated by Mr. P. F. Kendall's map of the Cleveland area.

In the January *Journal of Botany* Messrs. Wilson and Wheldon record *Kantia submersa* from Cockerham Moss, Lancashire—a new British hepatic.

Mr. Samuel Moore contributes a 'Note on an Unmapped Toadstone Bed in the Derbyshire Mountain Limestone' to the February *Geological Magazine*.

Messrs. Wheldon and Wilson, in the *Journal of Botany* for December, give localities for mosses and hepatics discovered in West Lancashire since their previous list, published in 1901.

The Manchester Literary and Philosophical Society has awarded the 1903 Wilde Gold Medal to Prof. F. W. Clarke, of the U.S. Geological Survey, and a Dalton Medal to Prof. Osborne Reynolds, F.R.S.

A brief account of the history of the Sunderland Museum appears in the December *Museum Journal*, from the pen of Mr. J. M. E. Bowley, curator. The museum contains a particularly fine series of Permian fossils.

In the *Geological Magazine* for January Mr. J. Lomas has a note on 'The Quartz Dykes near Foxdale, Isle of Man.' Various quartz veins are enumerated, and the author considers that these are true igneous dykes.

The items of interest to northern readers in the December *Zoologist* are all ornithological. Rev. F. C. R. Jourdain gives 'Rough Notes on Derbyshire Ornithology, 1900-1902.' A Little Bunting is recorded at Durham, and a Knot at Bowden, Cheshire.

In the January *New Phytologist* Mr. F. W. Oliver has a note 'On the Identity of *Sporocarpion ornatum* Will. and *Lagenostoma physoides* Will.,' in which he points out that the former is nothing else than a transverse section of the latter—a seed from the Halifax coal-measures.

In view of the assistance received from the Yorkshire Naturalists' Union Winter Lecture Scheme, the Barnsley Naturalists' Society has decided to contribute a guinea per annum to the Union's funds in addition to the usual fee. We trust this excellent example will be followed by others.

The 'Seventh Report of the Southport Society of Natural Science' contains abstracts of papers read at the Society's meetings. The only one of interest to northern readers is on 'Caves,' by H. Broderick. A 'List of the Lepidoptera of Southport and District,' by E. B. Hobson, occupies pp. 37-46.

'The Migrations of the Fieldfare (*Turdus pilaris*) and Lapwing (*Vanellus vulgaris*) during 1880-1887' are dealt with in detail by Mr. W. Eagle Clarke, in the 'Report of the Committee on Bird Migration in Great Britain and Ireland,' submitted to the Belfast Meeting of the British Association.

In reference to the note headed 'Silverdale Plants,' in *The Naturalist* for October 1902, p. 316, Mr. S. L. Petty writes as under:—'In reply to Mr. Kirkby, *re* Cotoneaster, may I be allowed to call his attention—and Mr. Pickard's also—to the statement in my paper, 'Bird sown?' I never looked on the plant, whatever species it might be, as native at Silverdale. Under these circumstances the 'ardent botanist' need not trouble himself. As both the above gentlemen know, I object to botanical Kensal Greens. As a field man I must leave the species I see where found; the 'ardent botanist' is under no such obligation and knows it. My thanks are due to Mr. Pickard for the correction.

Mr. Wm. Ingham, B.A., of York, has prepared a pamphlet entitled 'Observations of Nature' for the use of teachers. It contains (1) 'Scientific Methods of Discovering the name of a Flower,' and (2) 'Observations on the Scientific Method above.' It has 14 pp., and is sold by A. Brown & Sons, 5, Farringdon Avenue, for 3d.

Mr. Charles Bailey, M.Sc., F.L.S., gives some interesting notes 'On the Adventitious Vegetation of the Sandhills of St. Anne's-on-the-Sea, North Lancashire (Vice-County 60)' in 'Manchester Memoirs,' Vol. XLVII., 1902-3, No. 2. These are accompanied by plates illustrating *Ambrosia artemisiæfolia*, L., and *Vicia villosa*, Roth.

Besides particulars of mollusca exhibited at the meetings of the Conchological Society, the *Journal of Conchology* for January contains two notes of interest to northern readers, viz.: 'Report on the Leasowe Ramble, 12th July 1902,' by R. Standen, (p. 258), and '*Helix rotunda*, Müll., m. *sinistrorsum*, at Castleton, Derbyshire' (p. 284).

The 'Zoological Record for 1901' was issued in December. The value of the work cannot be over-estimated. Over one thousand entries appear in the list of periodicals consulted, and during the year over 2,000 new generic names were registered. In future the 'Record' will be increased in usefulness by the divisions being issued separately.

Three notes of interest to northern coleopterists appear in the December *Entomologists' Record*, viz., Coleoptera taken in 1902 in the Southport district; a day amongst the Coleoptera on the southern end of Lazonby Fell, and Coleoptera in Barron Wood, Cumberland. The same journal also contains other notes of interest to our entomological readers.

The 'Report of the Committee of the Natural History Society of Northumberland, Durham, and Newcastle-upon-Tyne,' shows that the Society is in a flourishing condition, having a membership of 231. Several additions have been made to the Society's Museum, including some local specimens, and the new curator, Mr. E. L. Gill, has overhauled and rearranged some of the collections.

Mr. G. W. Lamplugh has recently visited the well-known 'Sponge-gravels' at Faringdon, and finds that the belemnites, which occur so abundantly there, are not Jurassic, as usually supposed, but may be referred to the *B. speetonensis* of Pavlow, which occurs in the *B. brunsvicensis* zone in the Lower Cretaceous at Speeton and in Lincolnshire. Mr. Lamplugh's observations are printed in the January *Geological Magazine*.

The first annual Conference of persons in the North of England interested in Higher Education was held at Manchester on 2nd and 3rd January, and was very successful. Over 3,000 teachers and others accepted invitations to attend. Professors Miall, Weiss, Armstrong, and Messrs. Hoyle, Wager, Lomas, and others familiar to our readers, contributed papers or took part in the discussions. Exhibitions were arranged to illustrate Nature study, etc.

Mr. J. Hopkinson, F.L.S., F.G.S., a native of Leeds, is the editor of the 'Transactions of the Hertfordshire Natural History Society and Field Club.' Vol. 11, Part 3, has recently been issued, and contains two contributions by the editor, one a record of meteorological observations, and the other a list of works on the geology of Hertfordshire. Mr. Hopkinson has recently been appointed to the direction of the Ray Society, vacated by the decease of Prof. Wiltshire.

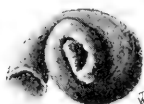
At the meeting of the Linnean Society on 4th December the Rev. John Gerard exhibited specimens of a *Polygala* from Grassington, which had been named *P. amarella* Crantz. He also showed a monstrous form of *Geum rivale* Linn., from between Long Preston and Settle; the terminal flower was apparently normal, but about 1½ inches below the calyx there appeared a whorl of about twenty petaloid members, on extremely long 'claws,' and surrounded by a series of leaf-like bracts.



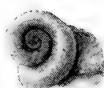
INTERESTING NORTHERN SHELLS.



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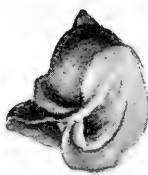
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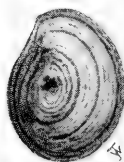
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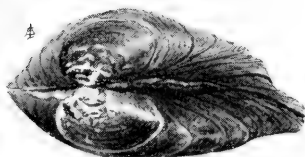
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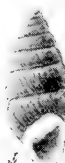
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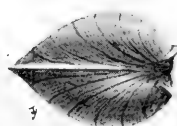
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NOTES AND COMMENTS.

AN IMPORTANT WORK

In view of the enormous interest attached to the study of Conchology, and the great variety of land, freshwater, and marine forms, it is somewhat surprising that this branch of natural history has not more devotees. In nearly every instance the 'shell collector' develops into an ardent malacologist, and consequently it is found that 'the hewers of wood and drawers of water' rarely rest until they have added considerably to our knowledge of the creatures they examine, if then. In calling to mind the various conchologists in the northern counties hardly one can be remembered who does not put heart and soul in his work. One of the most enthusiastic of these is unquestionably Mr. J. W. Taylor, of Leeds, who with the aid of pen and pocket has placed naturalists under a deep debt of gratitude for the excellence of his work. So long ago as 1894 Mr. Taylor issued the first part of his 'Monograph of the Land and Freshwater Mollusca of the British Isles,' which was duly noticed in these pages. (*Naturalist*, 1895, pp. 14-17.) From that time part after part appeared, at intervals, until eventually Volume I. was completed, to the admiration and profit of all interested in shells, though at considerable sacrifice on the part of the author. It is to this volume we now call attention, the sub-title of which, 'Structural and General,' defines its scope.

ON SHELLS.

It is a substantial work, of over 450 pages, with six coloured plates, and nearly eight hundred illustrations in the text; well printed on good paper—both letterpress and illustrations being the work of Mr. Taylor, and every page proves conclusively that it has been a 'labour of love.' Of the coloured plates we cannot speak too highly. They appear to be as near perfection as it is possible to reach. We trust that all those who are able will encourage the author in his difficult task by purchasing a copy of the completed volume (only a very few of which remain on hand), and also by continuing to subscribe to the work, which, it is sincerely hoped, may be completed at no very distant date, though the careful manner in which it is conducted necessitates a certain amount of time being occupied.

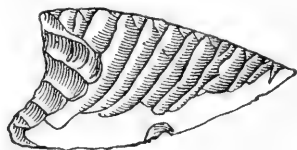
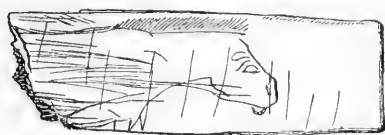
INTERESTING NORTHERN SHELLS (PLATE I.).

The figures on the plate, for which we are indebted to the publishers, have been selected at random, and all are connected with the district covered by this magazine. They will convey a far better idea of the nature of the illustrations than any words of ours, and they also indicate the variety of subjects dealt with. Figs. 1-4, dorsal and side views of two examples of *Planorbis carinatus* Müll, showing the grotesque and irregular coiling due to abnormal conditions; collected in Leventhorpe Pastures, Leeds; Fig. 5, *Planorbis spirorbis* monst. *priscum* from Gorton, near Manchester; Fig. 6, an example of a gibbously inflated univalve (*Limnæa auricularia* var. *gibbosa*) from Moortown, Leeds; Fig. 7, *Limnæa palustris* var. *lucunosa* from Leeds; Fig. 8, *L. peregra*, showing three distinct and separate peristomes, from Allerton-Bywater; Fig. 9, *L. peregra*, showing parallel linear markings, probably due to injury, from Penistone; Fig. 10, *L. peregra* var. *labiosa*, with reflected lip, from Huddersfield; Fig. 11, an example of *L. stagnalis* with gibbously inflated body whorl, from Osmondthorpe, Leeds; Fig. 12, *L. stagnalis*, showing by the irregular growth the baneful influence of chemical refuse discharged into the lake, from near Prestwich, Lancashire; Fig. 13, an example of a concentric operculum (*Vivipara contecta*), from Southport; Fig. 14, *Helix nemoralis* var. *conica*, from Seacroft, near Leeds; Fig. 15, *H. cantiana* var. *albocincta*, showing supposed atavistic evidence of spiral banding, from near Osgodby; Fig. 16, variety of *H. nemoralis* from Spurn; Fig. 17, *H. aculeata*, showing corona of spines, from Bassenthwaite; Fig. 18, *Unio tumidus* Phil., showing the dwarfing and distortion of the shell owing to proximity to the dam, from Yearsley Lock, near York; Fig. 19, *Pupa secale* var. *edentula* from Ingleton; Fig. 20, *Azeca tridens*, showing the inflexible calcareous lamella, assumed to represent the Clausium, from Roundhay, near Leeds; and Fig. 21, *Pisidium henslowianum*, showing endogastric direction of the umbones, from Cockerton, Darlington.

RELICS OF THE STONE AGE.

Mr. C. H. Read, F.S.A., Keeper of the Department of British and Mediæval Antiquities in the British Museum, has issued an admirable 'Guide to the Antiquities of the Stone Age.' This will be most useful to those interested in the early history of Britain, and the value of the Guide is considerably increased by the ten plates and 142 illustrations in the text, which illustrate

the principal types of Palæolithic and Neolithic objects. Particularly useful is the account of the various Bone-caves that have been found in Britain from time to time. Two of the illustrations are here reproduced through the kindness of the Trustees of the British Museum. The first is an engraving of a horse's head on bone, from Cresswell Crags, Derbyshire,



and is of Palæolithic Age. The second represents a peculiar type of Neolithic arrow-head, showing parallel or 'ripple' flaking. Implements of this type are exceedingly rare in Britain, and appear to be confined to the neighbourhood of Bridlington.

'THE BIRDS OF YORKSHIRE.'

We would like to draw particular attention to one of the most important works yet undertaken by the Yorkshire Naturalists' Union, viz., 'The Birds of Yorkshire,' by T. H. Nelson, M.B.O.U., with the assistance of W. Eagle Clarke, F.L.S., M.B.O.U., and Mr. Fred Boyes.

The scope of the work will be comprehensive, and the account of each species will include succinct accounts of distribution, faunistic status, migration, nidification, variation, vernacular nomenclature and folk-lore, with full details when necessary, and critical and detailed particulars of the occurrence of the rare species; while under each species will be incorporated a verbatim reproduction of the account given of it by Mr. Thomas Allis, in 1844, whose list (the earliest Yorkshire one) of that year has never been published.

Illustrations will be included of noted bird-sites or haunts, and interesting phases of bird-life within the county, the number of which will depend upon the amount of the subscription list.

The work will be shortly issued, and intending subscribers should send in their names at once to the Secretary of the Union, at The Museum, Hull, from whom a detailed prospectus can be obtained.

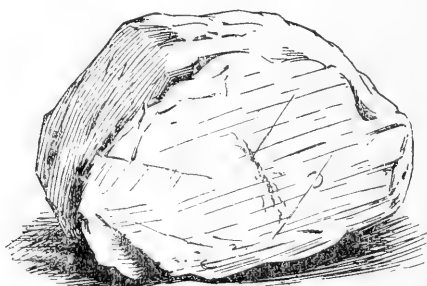
HUDDERSFIELD MUSEUM AND EDUCATION.

The excellent work Mr. H. Crowther is doing in Leeds by his museum lectures is well known. Recently he delivered a lecture to a number of children and teachers of the elementary

schools of Huddersfield in illustration of his scheme. The intense interest taken in it by the children made it evident to all that such lectures would form a very valuable method of instruction, and not only serve to greatly brighten the school life of the children but also widen their interest in the common objects around them. It is to be hoped that the new education authority will take the matter into their serious consideration, and do something to develop the local museum at Huddersfield now struggling for existence against great odds, and render it of real value to the town, and an important adjunct to their educational institutions. Excellent work is being done in other towns in this direction, notably in Liverpool, Manchester, and Hull, and we trust Huddersfield will not long lag behind.

AN EAST YORKSHIRE ERRATIC.

One of the finest glacially striated boulders ever found in East Yorkshire has just been placed in front of the Municipal Museum at Hull. It was found at a depth of 15 feet in the boulder clay at Kelsey Hill, near Burstwick, in Holderness, during the excavations made for gravel by the North Eastern Railway Company. It is of Carboniferous Limestone, originating in all probability from Teesdale. It measures 4 ft. 9 in. long,



3 ft. 5 in. high, 2 ft. 5 in. wide, and weighs about $1\frac{1}{2}$ tons. It is crowded with fossils, e.g., corals (three species), *Productus semireticulatus*, stems of encrinites, etc. One face of the boulder ($4\frac{1}{2}$ ft. by 3 ft.) is beautifully planed and striated. This striated surface formed the under side of the boulder when first found. The District Engineer, Mr. Edward Smith, was good enough to arrange for its removal from the gravel-pit to Hull, free of charge. Some idea of its appearance can be gathered from the accompanying block, kindly lent by Mr. J. O'Hara.

CHRISTMAS AFTERNOON'S FUNGUS RAMBLE.

W. N. CHEESMAN,

Selby.

AFTER a hearty Christmas dinner, I reversed the old adage by deciding to 'walk a mile' instead of having a 'rest awhile.' So, shouldering my vasculum and donning my strong boots, I set off for Stayner Wood, once part of Selby Abbey's possessions. In 1257 Sir Richard de Berlay, Knt., quit-claimed the Park of Stayner to Selby Abbey, and the Commissioners' valuation of 1540 runs: 'Item ther is a wod called Stayner pke set with yong okes & some tymber trees cont xxvi acres the herbage wherof ys worth by est yerely xv^s.' It is about a mile from the town, and is now used as a game preserve.

One of my boys wished to accompany me, and the desired permission was given. As we went along I tried to interest the boy by telling him that many years ago there was a subterranean passage (tradition so states) from Selby Abbey to Stayner Wood, by means of which men could elude their pursuers. This was in the old times when all agarics would be called by the good old-fashioned name of 'toadstools,' instead of the 1,500 names by which British species are distinguished at present. On approaching the wood, a grass field, which in September was aglow with yellow, red, and pure white *Hygrophori*, was drawn a blank, except for a few surviving puff-balls (*Lycoperdon gemmatum* and *L. pyriforme*), which still possessed their characteristics for amusing my companion. The first inlook to the wood was not promising; a thick covering of dead bracken was strongly in evidence, and not the least sign of a fungus in sight. I was ruminating on the wine and dessert I had forfeited that afternoon, when my lad came running up with something in each hand—in one was a piece of rotten stump, and on it a lovely little white, cup-shaped fungus about one-eighth of an inch diameter (*Dasyscypha virginea*), and in the other a larch twig with another like gem, but with a bright orange-coloured disc and white margin (*D. Calycina*). We then commenced the search in earnest. The old stump was covered with the white *Dasyscypha*, and all the larch twigs on the ground bore some of the orange ones. It appears that the mycelium of this little fungus is very destructive to the larch and other conifers, especially when growing in a damp soil. We found it

almost useless to look for fungi down the drives and open spaces in the wood; in September these were all ablaze with *Amanita muscaria*, the big scarlet king of fungi, which is at once the handsomest as well as the most poisonous of our British species; the orange-coloured *Peziza aurantia*, and many others. Our examination of old stumps and rotting wood proved most fruitful: *Polystictus versicolor*, with its varied hues and multi-coloured zones; the ubiquitous *Stereum hirsutum*, and here and there *S. purpureum* and *Xylaria hypoxylon*, the black and white 'candle-snuff' fungus; *Corticium lacteum*, *C. sebaceum*, *Polystictus velutinus*, *Poria vaporaria*, etc. On the under sides were one or two species of resupinate *Hydnei*, especially *H. farinaceum*; also *Merulius lacrymans*, the dry-rot of timber, which, when in growing state, exudes drops of water. My boy, after asking its name, said that second word (*lacrymans*) meant something about crying, as it occurred in his last Latin lesson at school, and he did not see why a fungus should be called by that name; but when I pointed out to him the tears it was shedding, perhaps for the havoc it had wrought, his face brightened, and he seemed to realise this old botanical 'chestnut.' In one corner of the wood devoted to oak trees *Scleroderma vulgare*, a hard, rough-coated puff-ball, was very abundant, and not far away we found on ash trees a few specimens of *Hypoxylon concentricum*, about two inches in diameter, shaped like the half of a potato, as hard as wood, brown outside, black inside, and with concentric zones like woody rings. The spores of this plant being enclosed in *asci* fixes its position in the order Ascomycetes, and is widely removed from the puff-balls.

A solitary *Dædalia quercina* was growing on an oak tree which had been cut to accommodate a fence. On the same tree was a large old beefsteak fungus (*Fistulina hepatica*); probably the spores of both had got to the tissues of the tree through the wound made for the fence.

My scout here signalled for help, and I found him struggling with an old broken plank floating in a deep drain. The plank had on it several patches of a white resupinate *Polyporus* which I afterwards found to be *Poria medulla-panis*. We had a narrow escape from a ducking whilst trying to land the big fish, but eventually it was gaffed. Some of the white *Poria* was collected, and what had appeared to me from the bank as a strip of red rag on the plank was really a *Poria*, also in form like the *medulla-panis*, but brilliant scarlet in colour. It took

me some hours that evening trying to run it down, but without result. A specimen sent to our Mycological Secretary, Mr. C. Crossland, brought the news that it was *Poria medulla-panis*, but attacked by another fungus, probably *Hypomyces rosellus*, parasitic on it, and the authorities at Kew afterwards confirmed his determination.

Calocera viscosa, a rich, dark orange-coloured, coral-like fungus, was seen on a Fir tree stump. The black-spotted leaves of the Sycamore revealed the presence of the Sycamore Blight (*Rhytisma acerinum*). The Saddle-flap or Razor-sharpener (*Polyporus squamosus*) was observed; one specimen, high up in an Ash-tree, seemed to be quite three feet across. The next find was a central-stemmed *Polyporus*. This was to me a rarity; it was growing in a crowded place and not well formed. Mr. Crossland puts it down to *P. brumalis*.

Armillaria mellea was not observed in the flesh, but several dead trunks and uprooted trees which had been strangled in its deadly embrace were seen still bearing the network of black-brown, cord-like mycelium by which this destructive agaric is distinguished. *Armillaria mellea* is an edible fungus, and makes a passable dish; in some seasons it is extremely plentiful, and causes some annoyance and disgust to inexperienced Mycologists by the different aspects and forms it assumes. In other seasons it is rarely seen; for instance, at the week's Fungus Foray last September at Egton Bridge only a single specimen was observed, and that was growing in the middle of the road in Mulgrave Woods (Whitby), unusual in place and unusual in its solitude, as the general habit of the plant is densely cæspitose.*

My boy said he thought that when a tree became sickly or decayed that fungi came to it and infested it. I tried to explain to him that trees and plants had diseases like human beings, and that botanists who studied these matters could enumerate almost as many of the diseases of plants as doctors could tell us of the number of complaints which affected mankind, and that the diseases of plants were caused almost entirely by fungi. As an example, I pointed to a lofty Birch tree near by, 'ornamented' with numerous large specimens of the Birch *Polyporus* (*Fomes betulinus*), and on nearing it we found several on the ground which had dropped with the dead branches. The mycelium was insidiously permeating the host plant under the bark and literally sucking the victim's blood. Several of the

* See Yorks. Fungus Flora Trans. 28, p. 24.—EDS.

plants were quite nine inches across. I must not forget to record a very pretty violet-shaded *Polyporus* (*Polystictus abietinus*) which was growing on Fir wood.

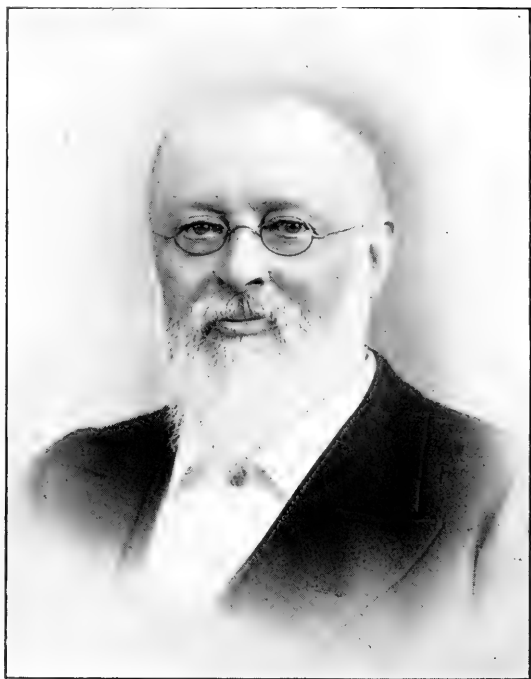
The light was now waning, and we left the wood to make for home, but a large old stick-heap attracted attention. It seemed to be the accumulation of years of the dead and dying trees of the wood, for the use of the neighbouring farmstead, and here, in about twenty square yards, we found the greater part of the species which had been already observed during the afternoon's ramble, also another of the central-stemmed *Polypori* (*P. varius*) growing in profusion on Birch. One, which was perhaps to me the most interesting find of the day, was *Lenzites betulina*. This is one of the gilled fungi (Agaricaceæ), but of a hard, woody texture, and very similar in appearance to some of the woody *Polypori*; it is, in fact, a sort of connecting link between these two great families. The specific name of this plant indicates that it gives a preference to the Birch for its habitat, but in this case it was growing on the Alder (*Alnus glutinosa*), which is in the same natural order as the Birch, viz., Cupuliferae.

The only gilled fungi seen during the afternoon were *Crepidotus mollis*, *Marasmius peronatus*, *Coprinus comatus*, and *C. niveus*. The two latter being too frail to travel, were eaten on the spot and found pleasant in taste, having a nutty flavour.

As we walked home in the gloaming, I thought (between my boy's anxious questions about fungi) it was a pity that so many botanists should hibernate for several months every year when there was so much new and interesting work to be done in cryptogamic botany. My Christmas holiday was charmingly employed with many microscopic treasures, such as *Nectria cinnabarina*, *Peniophora quercina*, *Tremella mesenterica*, *Trichia varia*, etc.; and, what is particularly interesting, nearly all those mentioned have dried without change in form or colour, and I am now arranging them in a case for our local museum.

CRUSTACEANS.

Crayfish in Nottinghamshire (ante p. 29).—Many years ago I and others caught Crayfish in the stream from the tarn or lake at Shireoaks—in the 'Park,' as I think it was called. If this should meet the eye of any old Pestalozzians no doubt they can confirm what I say.—S. L. PETTY, Ulverston, 7th January 1903.



9 Parish Church
Ipsley 24 July 1906

With kind regards
Yours faithfully
C. P. Roovink

In Memory of CHARLES P. HOBKIRK.

Born 13th January 1837. Died 29th July 1902.

THE debt of gratitude which the naturalists of Yorkshire owe to the memory of their deceased friend, Mr. Charles P. Hobkirk, is simply incalculable, and the services which in virtue of his many-sided nature he was able to render to the cause of natural science in his dearly-beloved native county have been great and far-reaching in their effects. As the historian and particularly as the pioneer natural historian of Huddersfield, his native town, as the guide, philosopher, and friend of many a young bryologist, as one of the Editors of this very journal at a critical time in the development of the natural sciences in Yorkshire, and as an active member and office-bearer in the Huddersfield Naturalists' Society and in the Yorkshire Naturalists' Union down to the very last active year of his life, and as regards his private relationships with us, his fellow-workers, he is entitled to a high place among the scientific notabilities of Yorkshire.

He was a Huddersfield man by birth and by descent, the only son of Mr. David T. Hobkirk, who was engaged in the woollen trade. He was born on the 13th January 1837, so that when he died he was in his 65th year.

By profession he was a banker, entering the West Riding Union Bank in 1852, when he was 15, rising there to the position of cashier, and in January 1884 becoming manager of the Dewsbury branch. He left the service of this bank in November 1892, returning to Dewsbury in 1894 as manager for another bank, and finally retiring in March 1897. He then lived at Horsforth and afterwards at Ilkley.

His scientific abilities and his energetic temperament soon brought him into prominence. In 1859, when he was but a year or so over age, he published his admirable book on 'Huddersfield: its History and Natural History,' which is a veritable treasure-house of information on the fauna and flora of the district, the foundation on which all subsequent work was based. The list included the plants, the mammals and birds, and the lepidoptera of the neighbourhood. This little work reached its second edition in 1868, when the various lists were amplified and others added.

About the years 1864 to 1867 was published a series of 'The Naturalist,' which extended to two volumes and a portion of

a third, the editorship of which was anonymous, but with which we believe our deceased friend had much to do. At all events he was the author of various papers in it, including notes on British Mosses, in which among others *Tetraphis pellucida* (1864), *Schistostega osmundacea* (1864), *Fissidens bryoides* (1865), *Bartramia fontana* (1865), and *Grimmia engyria* (1866) were treated of. He also wrote in 1866 on the Forms of *Cratægus oxyacantha*, on the occurrence in Britain of *Rosa cuspidata*, and gave an account of M. A. Déséglise's Revision of the Section *Tomentosæ* of the genus *Rosa*.

'The Naturalist' collapsed in 1867, but in 1875, after a gap which was partially bridged over by a Wakefield published magazine, 'The Yorkshire Naturalists' Recorder' of 1872, it was again revived at the desire of the West Riding Consolidated Naturalists' Society and practically as the organ of that body, and Mr. Hobkirk, in conjunction with his firm and life-long friend, Mr. George T. Porritt, F.L.S., became editor. This joint-editorship lasted nine years, until 1884, when the editorship passed into other hands, and the Yorkshire Naturalists' Union afterwards took up the financial responsibility.

Coincidentally with the editorship of this journal, Mr. Hobkirk was most active as a member of the Huddersfield Naturalists' Society, of which we believe he was more than once President (certainly in 1873), also as one of the leading spirits of the old West Riding Consolidated Naturalists' Society, at whose meetings he was a diligent attendant, and one of the chief botanical referees, which task was often shared by the Rev. William Fowler. More than once, we believe, Mr. Hobkirk was President of the W.R.C.N.S.

In the series of developments whereby the old West Riding Society became transformed into what we know as the Yorkshire Naturalists' Union, Mr. Hobkirk took an active and leading part. In fact, he was the first to go of a quartette of members who took part in what may be called a 'sub-committee meeting' at which the reform of the old Society and the present constitution of what soon became the 'Y.N.U.' was first put into a definite form which was almost identical with the present practice and procedure of the Union, everyone of its leading features being definitely outlined at that meeting.

In the proceedings of the Union Mr. Hobkirk was an indispensable member—his geniality and urbanity, thorough grasp of business, and full appreciation of every scientific aspect, contributing no little to the scientific success which has always

characterised its proceedings. Mr. Hobkirk was a member of the Executive throughout, down to the very year of his illness, and in 1892 the Union showed its grateful appreciation of his services by making him President. The history of the Union formed the subject of his address, delivered at Huddersfield in his absence from illness.

A botanist throughout his life, he was a bryologist by specialist preference, and it was as a student of the mosses that he made his mark in science.

In 1873 he published his 'Synopsis of the British Mosses,' a handy volume giving brief terse descriptions of all the genera and species found in Great Britain and Ireland, a little work of which a second edition appeared in 1884, and which has proved useful to many a young student who needed a useful stepping-stone to the more advanced and technical works of Schimper and Braithwaite.

The same year (1873) he read a paper to the British Association at Bradford on 'The Mosses of the West Riding of Yorkshire,' which was afterwards printed in 'The Journal of Botany,' following it up in 1879 and 1880 with additional records.

In 1877 he compiled, along with Henry Boswell of Oxford, the first 'London Catalogue of British Mosses,' and this reached its second edition in 1881, both published for the Botanical Locality Record Club.

Mr. Hobkirk's intellectual activity took other forms. He was the first to prepare and have printed a River-Drainage Map of the West Riding for scientific purposes in 1872, and he also interested himself in evolutionary problems, moot points of vegetable physiology, the preservation of our native plants, and other like topics. He even essayed in pure literature, writing in 1881-82 a novel which was published in 'The Huddersfield Weekly News,' the title being 'Sir John de Eland, Knight, a Legend of the 14th Century,' and his nom-de-plume 'H. P. Carlton.'

Appreciation of his worth was not wanting. Not only was much tacit and spoken confidence reposed in him, both in business, scientific, and private life, but on each of the two occasions on which he changed his place of residence he was presented with silver plate and an illuminated address, on leaving Huddersfield in October 1884 and Dewsbury in December 1892.

He was married at Huddersfield on the 5th of August 1863, and his wife, after a long and painful illness, died before him. He lost his youngest son unexpectedly about a month or two before his own decease.

An attack of enteric fever while at Dewsbury had pulled him down much, but he brightened up considerably on retiring to live at Ilkley. His own illness was a painful one, of long duration, which, on the 29th of July 1902, came to an end, at Ilkley. He was buried at Huddersfield Cemetery, when the Yorkshire Naturalists' Union was officially represented, and the wreath deposited on his grave in the Union's name was a cryptogamic one, being of Reindeer Moss, most appropriately fitted to pay the last tribute of respect from his scientific colleagues to a departed student of cryptogamia. R.

BEAVERS IN YORKSHIRE.

HARRY SPEIGHT.

IN Messrs. Clarke and Roebuck's useful monograph on 'The Vertebrate Fauna of Yorkshire' (1881) it is stated that the only grounds for surmising that the European beaver ever inhabited Yorkshire are afforded by place-names, such as Beverley, in the East Riding; Beaverholes and Beaverdike, in the Forest of Knaresborough; and Beevor Hill or Beverhole, near Barnsley, in the West Riding. But there is, I understand, a document in the possession of the Corporation of Beverley which proves the actual existence of the animal in that neighbourhood in the twelfth or thirteenth century, and it is a significant fact that the ancient chain of the Mayor of Beverley—a relic of the fourteenth century—consists of eagles (emblem of St. John the Evangelist, to whom the church was dedicated) and beavers. The situation of the place by open water meadows, as the name implies, was well suited for the habits of the beaver, and there are many other spots, especially in the low-lying districts of Holderness, where one might expect this aquatic creature found a solitary existence late in historic times. No doubt it was of the same family as still exists in Scandinavia and Northern Europe, cut off in early ages by the encroachments of the North Sea.

The names quoted by Messrs. Clarke and Roebuck favour a late English survival, and I have also thought that the extensive and retired 'Marshes' at Bolton Percy a very likely spot where the creature might have survived even to a later period than in the more inhabited district of Beverley. In searching the old Parish Accounts at Bolton Percy a year

Naturalist,

ago I discovered this entry under the date 1790:—‘Pd. for a bever head, 2d.’ It is of course possible that this may not be the record of a true beaver, and may be intended for some other animal. Any information on the subject will, I am sure, be welcome to all students of Yorkshire history.

NOTE ON ABOVE PAPER.

BEAVERS IN EAST YORKSHIRE.

THOMAS SHEPPARD, F.G.S.

‘BEVER-HEADS’ is an item occasionally found in old parish accounts, and refers to heads of the otter, not the beaver. A single skull of a beaver, however, has been found near Beverley, and was described and figured by Ed. Tindall in a paper, ‘Remarks on the Extinct Fauna of the East Riding of Yorkshire.’ (Report of Proceedings of the Geological and Polytechnic Society of the West Riding of Yorkshire, 1869, pp. 7-14). As this paper seems to have been almost overlooked by later writers, I give the paragraph referring to the beaver in full:—‘Of the former animal [beaver] a very fine skull was exhumed during some extensive drainage operations on the banks of a river near Wawne, in the neighbourhood of Beverley, in 1861, by Dr. Brereton, and who has kindly allowed the specimen to be exhibited at this meeting. The skull, it will be observed, has every indication of having belonged to a mature individual, measuring six inches in length, and four inches in width across the posterior part of the zygoma. The nasal bones, one incisor, and six of the molar teeth are wanting; in every other respect the skull is in a fine state of preservation, and deeply coloured by the peat.’ Under and side views of it accompany Mr. Tindall’s notes. It would be interesting to know where this skull now is.

The greater part of a skeleton of a beaver was found in the peat-bed at Withernsea a few years ago by Mr. Pygas, jun., of Withernsea. This peat-bed is occasionally exposed on the beach at low tide, near the remains of the pier. The late Dr. H. B. Hewetson borrowed the bones for his ‘Museum’ at Easington, but, unfortunately, their present whereabouts is unknown.

Some beaver bones were obtained by Mr. Thomas Boynton, F.S.A., during his excavations of the ancient lake dwelling at Ulrome, in Holderness, proving that it existed in East Yorkshire

contemporaneously with Neolithic man.* Mr. J. R. Mortimer has also met with beaver remains in his excavations amongst British wold barrows. For example, a beaver's tusk was found in the Duggleby Howe, opened in 1890. This specimen is figured on Plate 9, which accompanies Mr. Mortimer's paper, 'An Account of the Opening of the Tumulus, 'Howe Hill,' Duggleby.' (Proc. Yorks. Geol. and Polyt. Soc., 1892, Vol. 12, Pt. 2, pp. 215-224). Another beaver tooth was found in a barrow on Painsthorpe Wold. Canon Greenwell, in his 'British Barrows,' 1877, p. 138, describes an instrument made from a beaver's tooth, found in a barrow in the parish of Langton, East Riding.

These known instances of the occurrence of the beaver in East Yorkshire in prehistoric times certainly seem sufficient justification for the assumption that some place-names probably are derived from the former presence of beavers in the vicinity.

FUNGI.

***Geaster lageniformis* Vitt.**—A fine sample of this rare *Geaster* (Earth-Star Fungus) was found at Cantley, near Doncaster, last November, and forwarded to me by Dr. Corbett. The only other Yorkshire record, so far as we are aware, is Beckfoot Lane, Bingley, 1882-3 (Lees' Fl. W.R.). Unfortunately, only one specimen was sent, which is now lodged in the Kew Herbarium.—C. CROSSLAND, Halifax, February 1903.

***Lachnea fimbriata* Quel.** (Cooke's 'Mycographia,' Pl. 113, Fig. 405).—It may be as well here to place on record this new British Discomycete, referred to in the 'Mycological Report' for last year. It was first noticed on the 2nd October 1902, growing on moist dust lining the wall of the cellar window area at my place of business. It continued to flourish till the end of November, and produced many good crops of ascophores in all stages of development. These were distributed to various centres, both at home and abroad, where they were likely to prove of interest. It is a well-marked species, hitherto only recorded for France.—C. CROSSLAND, Halifax, February 1903.

* These consist of half the lower jaw with incisor and molars, also three other incisors and some molars, and several bones. Mr. Boynton also informs me that many of the timbers in the lake dwelling showed traces of the 'cutting' of the beaver.

LINCOLNSHIRE FRESHWATER MITES.

C. F. GEORGE, M.R.C.S.,

Kirton-in-Lindsey, Lincolnshire.

Piersigia limophila Protz. This is to my mind one of the most beautiful and interesting of all the water mites. It appears to be scarce, and was first described by 'Protz' in 'Zoologischen Anzeiger' for 1896, page 410. It belongs to Koch's division, 'Sumpfmilben,' or mud mites, having no swimming bristles on the legs; it crawls about on the surface of the mud in a tolerably active manner, but cannot swim. Its differences in structure from all other water mites necessitated the formation of a new genus, '*Piersigia*,' and, so far, I am not aware that another species of the genus has yet been discovered. I found it in the parish of Manton, near Kirton-in-Lindsey, in April, 1902. Its colour was a very rich scarlet, with dark blotches produced by the contents of the cæca. The numerous plates of chitin embedded in the skin are of various shapes, and complicated structure, and are admirable objects for the microscope. The thoracic plates are large, and clearly defined; the genital plates are large, and covered with acetabula; the anal plate is of singular shape, and thickly perforated; and in addition to these numerous plates there is a network of very fine chitinous threads, reminding one of a suit of chain armour. The proboscis, or snout, is circular at its apex, and can be either retracted or bent underneath, and this the creature frequently does when crawling about. The palpi have the distal joint sunk somewhat into the next internode, and the third joint has the distal end enlarged and provided with a rather remarkable bunch of hairs. The figures are sufficient to give a good idea of the creature, but nothing short of actual examination under the microscope will show clearly the complicated structure of the various pieces of chitin.

Piersig, in his description in 'Das Tierreich,' says 'sex unknown.' My specimen, however, was unmistakably a mature female, for its sack-like body was crowded with eggs, and doubtless the specimens taken by Protz were also females. If such be the fact, the male has yet to be discovered.

Figure 1 represents the dorsal surface of the mite, and if coloured scarlet (the legs a little paler than the body) would give a good general idea of the creature, as seen under a low power of the microscope.

Figure 2 shows the epimera, genital, and anal plates on the under side.

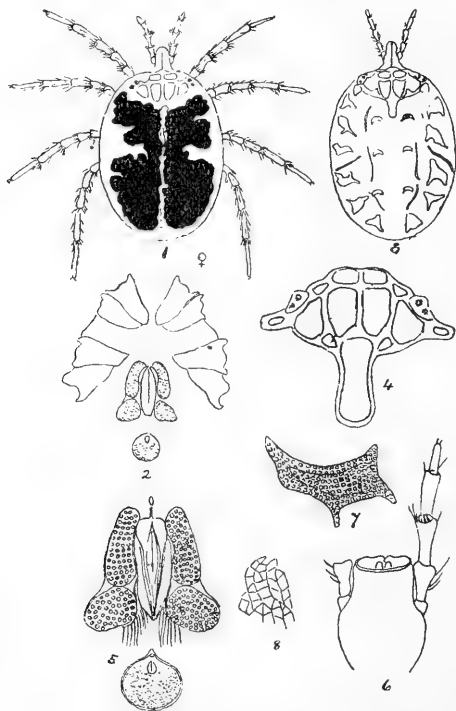
Figure 3—the chitinous plates embedded in the dorsal skin, best seen after soaking in preservative solution for some time.

Figure 4—the thoracic plates and eye capsules.

Figure 5—genital and anal plates, highly magnified.

Figure 6—the proboscis with one palpus attached, and showing the enlarged third joint and bundle of hairs.

Figure 7—one of the chitinous dorsal plates, much magnified.



Piersigia limophila Protz.

Figure 8—a portion of the delicate network-like layer of chitin.

The measurements of the creature are:—Body, length, 2.40 mm.; body, breadth, 1.92 mm.; first leg, length, 1.28 mm.; second leg, length, 1.44 mm.; 3rd leg, length, 1.44 mm.; palpus, 0.56 mm.; proboscis, 0.34 mm.

Mr. Soar kindly drew the figures for me, and also gave me the measurements.

HOLIDAY AMONGST NORTHERN MOSSES.

REV. C. H. BINSTED,
Breinton Vicarage, Hereford.

ON 30th June 1902 I met two friends—Rev. A. Ley, of Sellack, Herefordshire, and Rev. W. R. Linton, of Derbyshire—on the way North, our destination being Chapel-le-Dale, situated between Whernside and Ingleborough. Mr. Ley had been there in the previous year, and found the region so rich in Hawkweeds, in which he is specially interested, that he determined to visit it again and asked us to accompany him. We arrived in the evening of one of the few hot days granted to us during a memorably dismal summer. The object of my visit being mosses, in the search for which I found Mr. Linton an enthusiastic companion, the wet and cold weather that had prevailed during the early summer was a matter of some indifference, and decidedly better for these plants than the droughts which we have had in some recent years during the holiday season. We spent four days at Chapel-le-Dale, and from there explored the fine gorges above Ingleton, the mist and wet that mostly prevailed rendering the high ground uninviting. It goes without saying that in such gorges the mosses were numerous, and amongst other species which we found must be mentioned in particular the rare and little-known *Hypnum incurvatum* Schrad. I had long wished to visit the Ingleton neighbourhood in order to investigate the habitat there of this species with which I had become somewhat familiar through having found it in several localities about Kendal, the only other district, so far as I am aware, in which it occurs in Britain. Mr. Linton and I had the pleasure of finding some good patches in perfect fruit, and it was with no little satisfaction that we observed it in several places. Other species worthy of remark were *Swartzia montana* Ldbg. on damp rocks near the stream in one of the gorges (fruit abundant), and *Mnium orthorrhynchum* B.&S., which grew in large tufts in the sandy deposit about rocks near one of the waterfalls, but no fruit was found.

On 3rd July we visited Heseltine Ghyll, and there found the rare *Zygodon gracilis* Wils. on limestone walls which, but for the occurrence of this moss, would have been quite uninteresting; and occasionally in similar habitats we found rather poor *Pseudoleskea catenulata* B.&S. It struck me as remarkable

that these species should apparently be restricted to the walls. Not a trace of either could I find on the rock of which the walls were built. Other mosses were numerous at Heseltine, and the place itself attractive. We regretted that the exigences of trains would not allow us to explore it carefully. Amongst other species we noticed plenty of fine *Orthothecium rufescens* B.&S. and *Bartramia Ederi* Sw. *Mnium affine* Bland was also good. In its typical form I have only once found this moss in Britain. The Heseltine specimens would seem to belong to a form intermediate between the type and the common bog forms.

On 4th July, the weather being wet and cold, and the main objects of my visit to North-west Yorkshire having been accomplished, I left for Scotland, and on the following day found myself established in the comfortable Bridge of Lochay Hotel at Killin, the beautiful place in Perthshire so well known to botanists as a centre from which to explore Ben Lawers and other hills rich in good things. One of the visitors at the hotel was Mr. Ll. J. Cocks, of Bromley, a good bryologist, with whom I made some pleasant excursions. We visited the familiar Craig Chailleach and the neighbouring points of Cruben, King's Seat, and the Ptarmigan Mountain, these being the prominent hills in the range to the north of Killin. This range is composed largely of mica-schist, which is always rich in mosses, and on it are found a large number of the rarest British species, many of them occurring on no other hills in Britain save Ben Lawers. As the range is already familiar to bryologists, it will be enough to mention a few only of the species which we found there. Amongst the rarest were *Campthothecium nitens* Schp. (found by Mr. Cocks), *Plagiobryum demissum* Ldb., *Tayloria lingulata* Ldb., *Thuidium decipiens* DeNot., *T. Philiberti* Limpr., *Mnium spinosum* Schwgr., *M. cinclidioides* Hübn., *Timmia Norwegica* Zett., *Webera albicans* var. *glacialis* Schp., *Amblystegium curvicaule* Ldb., *Myurella apiculata* B.&S. Of these, one had always supposed the latter to be extremely rare even on the Craig Chailleach range of hills. A careful search, however, revealed it in some abundance throughout the cliffs of these hills. Owing to its habit of growing amongst other species it might be overlooked by anyone not having it in mind. It is quite a little gem when viewed through a lens, and its slender stems may be found in almost every tuft of *Encalypta* that one examines, mosses belonging to the latter genus being apparently its favourite hiding-places.

Whilst staying at Killin I visited some moorland where, seventeen years ago, I found a quantity of the rare *Tayloria*

tenuis Schp., and again had the pleasure of gathering a fair quantity of it. Like some of its near relations, it has a way of ripening its capsules unevenly, and fine tufts had to be left undisturbed owing to the fruit being immature. Other tufts had capsules fully ripe and discharging yellow-green spores in remarkable profusion. In 1885 I found it in open, swampy ground, but on my recent visit all I could see of it was growing in seclusion amongst heather.

On 12th July I went from Killin to Fortingall, at the entrance to the beautiful Glen Lyon, which is some 26 miles in length and extends nearly to Ben Douran and the West Highland Railway. The botanist contemplating a visit to this Glen would do well to provide himself with a cycle: the road up the Glen looks good, and near its head are some mountains but little known on account of their distance from everywhere. The principal attraction of the lower part of the Glen, from the point of view of the bryologist, and undoubtedly of the tourist also, lies in the wild river-gorge, with its profusion of great rocks. On these, as might be expected, occur some interesting mosses, foremost amongst which are *Bryum Mildeanum* Jur., which is fine there. Other interesting species are *Grimmia robusta* Ferg., *Gr. commutata* Hüb., and *Gr. ovata* var. *cylindrica* Hüb.

I refrain from expressing an opinion with regard to the specific value of *Grimmia robusta* Ferg., which to the student of *Grimmia* is at any rate a very interesting moss. The Glen Lyon specimens, though good, are not so fine as some I gathered on rocks by a small lake in the mountains near Glengariff, in Ireland. For the benefit of bryologists wishing to become acquainted with it, it may be worth while to observe that it seems to evince a preference for large rocks near water, it being in this respect like *Gr. subsquarrosa*, which, though found in other habitats, is never so fine as when growing very near water—for instance, upon boulders on the shore of Loch Tay. *Gr. commutata* Hüb. is generally a rare species in Britain, at any rate in our hills, where, if anywhere, one would naturally expect to find it. It grows plentifully on old stone-tiled roofs of buildings to the west of Hereford, and in Radnorshire I have found it growing on basalt and *fertile*. In Scotland and the English Lake District, however, it seems rare. Specimens from Glen Lyon are very slender and elongated. *Gr. ovata* var. *cylindrica* is another rare moss, and, like that just mentioned, was found in a slender and elongated state on rocks by the Lyon. Indeed, so much alike are the two forms that it is difficult to distinguish them with the naked eye.

Whilst at Glen Lyon I made several attempts to work on Ben Lawers, but owing to the wet and cloudy weather was able to do but little. On one occasion I had the pleasure of meeting Mr. Cocks there, and, with him, of exploring the West Ravine, where we found many good things, notably *Timmia austriaca* Hedw., one of the rarest of British mosses, growing in company with *Hypnum cirrhosum*, another rare species. Amongst other species found by us on Ben Lawers may be mentioned *Hypnum Halleri* L.f., *Hyp. sulcatum* Schp., *Blindia cæspiticia* Ldb., *Heterocladium squarrosulum* L., *Mycorella apiculata* (in several places), *Brachythecium plicatum* B.&S., *Barbula icmadophila* Schp., *Hylocomium pyrenaicum* Ldb., and *Hylo. umbratum* B.&S. The latter was found amongst boulders, and was poor. To see it at its best one should visit the woods of the Ballachulish neighbourhood, where it grows luxuriantly. I may mention here that I found it fertile on Connor Hill, co. Kerry, in 1896.

On one of my visits to Ben Lawers I came across *Hypnum turgescent* Schp., not hitherto recorded as British, but somewhat frequent in bogs in Norway, where I first became familiar with it. The Ben Lawers' specimens are as fine as any I have seen, and the moss seemed quite at home there. For obvious reasons I refrain from indicating the part of the mountain where I found this *Hypnum*, but I may add that it will give me pleasure to send a specimen to any bryologist who has not received one through the medium of the Moss Exchange Club. It may also be worth while to record the occurrence on Ben Lawers of very fine and plentiful *Aulacomnion turgidum* Schwgr. This species seems not to be very rare on the Perthshire mountains, but I had not previously heard of its being found on Ben Lawers.

Of Schiehallion, to which a day was given, there is little to be said. This mountain, otherwise fascinating, proved very bare of plants of all kinds. It gives rise to the Keltney Burn, which towards Loch Tay becomes a deep and precipitous gorge, rivalling the gorges above Ingleton, in Yorkshire. Like many other such places, it proved to be disappointing to the bryologist, and much rough scrambling resulted only in the observation of such mosses as might have been expected in a locality of the kind. *Weisia curvirostris* C.M., however, occurred on dripping rocks.

Allusion has been made to the indifferent weather experienced in the summer of 1902. It was mainly owing to this cause that I was denied a supreme pleasure of the student of the British mosses—a long day in genial weather upon Ben Lawers.

EQUIPMENT OF THE FIELD NATURALIST.*

REV. ALFRED THORNLEY, M.A., F.L.S., F.E.S.,
South Leverton, Lincoln.

It may be expected from the title of these notes that I am going to refer to butterfly nets, killing bottles, vascula, and such necessary impedimenta of the field naturalist. My object, however, is to call attention to another kind of equipment, much more important, I venture to think, than these things to which I have just referred. I allude to that mental equipment without which field work becomes vain and unprofitable. Do we not see everywhere around us ghosts of the temporary passion for natural history which held us at one time? In this way nothing is more pathetic than the sight of the microscope standing in enforced idleness under its glass shade in the sitting-room or study, or the dusty collection of insects somewhere about the house, all telling the usual story of a short-lived ardour. Why have we abandoned the hobby that once fascinated us so greatly? It is perhaps not always easy to answer this question; but I will dare to say that the ideas with which we started to investigate Nature were not adequate to the task. That which we thought so fascinating proved at last monotonous, and so was given up. When we had collected all we could—when we had amassed heaps of plants and animals, we did not know how to study them. Then there came a time when there was but little more to collect, and then what next? The ideal was attained, and in its attainment proved most unsatisfactory and there was nothing beyond. The first thing then in the field naturalist's thoughts should be '*study*,' not the mere amassment of material. It is better to know the life-history of a single beetle than to possess the three and a half thousand species which the British list contains. Then it is important that this study should be wide enough. The field naturalist should learn all he can, all he has time for. It is a common thing to find some who pay exclusive attention to some order or group of living things and refuse almost to look at anything else; consequently they are shockingly ignorant of things which lie close around and beside them, and are inextricably correlated with those very objects in which they are most interested. There are lepidopterists who will not look at beetles, or flies, or bees, or birds, or flowers; and there are botanists who will not look at insects. Now, whilst it is an

* Presidential address delivered to the Lincolnshire Naturalists' Union, 11th December 1902.

excellent thing for a time to work at one group of living things, this need not be done at the cost of totally neglecting all others. The conclusions gathered from a special study are usually more sound and valuable when that special study has been preceded by a good general knowledge of the whole subject, and not only of one branch of it. Which of us, in reading those charming letters of Gilbert White, the prince of naturalists, does not feel that the fascination of them springs from the full and generous knowledge with which his mind was stored. Suppose he had become a mere collector of beetles, what would the world have lost? I say, therefore, to the field naturalist, read all you can until the purpose of your study becomes clear to you. Our age is rich in books telling us how to go to work. Need it be said that every naturalist should provide himself with a good general 'Natural History'? There are so many that it is almost perplexing to recommend one before another. For those who have time and leisure I would recommend a little study during the winter months of some of the small primers of botany, zoology, or biology. It is surprising what a lot one can learn in this way, even if one can only get in half an hour's reading a day: but the present craze for reading novels and magazines is much against serious reading of all kinds. The general reading I lay stress upon, because it is a most important thing; without it the mind fails to see in their proper perspective the facts which it has learnt. How many crude and absurd theories have been floated through this defect of general knowledge! Inquire into the educational history of our most noted specialists, and it will be found that most of them are men of wide and varied learning. The great danger of the educational system of the present day is that it tends to specialise too early, just as the weakness of the old education lay in its generality and too great diffusiveness.

Once more every naturalist should keep a diary. A brief entry of anything of interest is easily made, and the habit of thus noting things is readily acquired. The value of such a diary is very great. It should always be at hand, for interesting things have a trick of happening at most inconvenient times. I need hardly state that any specimens acquired should be at once labelled, localised, and dated. The neglect of this simple but necessary rule has caused me lately a great deal of disappointment and almost irritation. I have seen many collections, but the bulk of them have been practically useless to me. They consisted of mere accumulations of insects from almost everywhere, and their scientific value was exceedingly small.

Granted then that our naturalist has read widely and generously on those subjects which will be of use to him in his vocation, it cannot be doubted but that he will attain to some kind of proper ideal, and that he will recognise in what directions his work will lead to the best results. For example, 'collecting' will mean to him no longer the act of accumulating specimens, but will be looked upon as a valuable aid to the fascinating study of the distribution of living forms, not only in his own county but finally over all the earth. From this point of view the study of the commonest insect will be as full of interest to him as that of the rarest—a thought quite alien to the mind of the average collector. And to give another example of study as dominated by the scientific ideal, the naturalist will never account that his study of an object is complete until he has seen it in contact with its proper environment, until he has traced out those numerous correlations upon which its very existence depends. Natural history is really the study of correlations—no animal or plant exists for itself, but for the good of the rest. For example, an ichneumon fly depends for its existence upon a certain caterpillar. The caterpillar in its turn depends upon a supply of leaves of a certain tree, the tree depends upon its roots being encased in a mantle consisting of the mycelium of a fungus. Destroy the last of these links and you destroy all. Or take the correlated-life of an oak tree. What amount of study would ever make us accurately acquainted with the whole? Yet herein lies the very fascination of the subject; the infiniteness, so to speak, of it; the feeling that there is always something to learn, something to be found out. That every line, colour, sound, movement, odour has some meaning with respect to the whole. To find out this meaning, to be able to put questions to Nature in the expectation that we shall get some answers which will go towards elucidating the wonderful mystery of the whole, that it is which makes natural history the most enchanting of all studies. Thus studied it leads always to a certain elevation of mind, a feeling which is a true symptom that we are on the right road. Our eyes are open to see the immense wealth of that Nature by which we are surrounded, to appreciate the infinite beauty and grace of form which everywhere exists, makes us feel—

This world's no blot nor blank,
It means intensely and means good,
To find its meaning is my meat and drink.

Now I take it that it is the very purpose of Natural History

Societies to set a high ideal of Nature study to the multitude, and to direct into profitable channels the desultory work which we so often observe in individuals. For example, what great use might be made of the camera in connection with the attitudes of birds, or the positions of leaves and flowers at different times of the day. I recently saw a beautiful lantern slide of a field of sleeping daisies, and then the same wide awake in the morning. I once had given a pretty photo of a Leaf-cutter Bee at work on a rose tree; and I have seen lately a wonderful slide of two butterflies asleep on a flower, and covered with dew drops. In infinite ways the camera might be made to do us great service. What could be more suitable for museum decoration than a fine series of Nature photographs? But the subjects are infinite which may rightly engage the attention of naturalists, and all have to do with the relation of living things to their environment—a conception now conveniently expressed by the term ‘bionomics.’ Mimicry, pollination, instincts, the movements and attitudes of plants and animals; such studies as these, as well as accumulating an accurate series of records, invaluable for the purposes of distributional zoology, will afford plenty of opportunity for work. Too often one gets from individuals the laconic reply, ‘I do not collect anything,’ to which one feels inclined to make answer, ‘My friend, you are not required to collect anything, but to observe everything.’

Nature study just now has sprung into notoriety—there is something almost like a boom in it. After years of educational experimenting our authorities seem lately to have found out that Nature teaching has a remarkable power in bringing out the observational faculty, having discovered that the ordinary curriculum of study has a tendency to train the memory, but does little for the observing powers. Moreover the very conditions under which Nature must be studied in the highest degree contributes to the health of the individual. It brings him out into the open fields and shady woods, to the purified atmosphere of the mountain top. It provides abundance of material at the least cost, and an infinite variety of subjects for study. This spirit then being in the air, so to speak, ought to lead to some accession to the ranks of Natural History Societies, and in the future they should be a recognised and honoured factor in that ideal of education which the nation has now set before itself. Let naturalists seize the opportunity, and by vigorous action play their part in leading the minds of those of our day and generation to profitable study and elevated ideas.

ORCHIDS OF THE DERWENT VALLEY.

J. W. FAWCETT,

Darlington.

THE Derwent is a tributary of the Tyne. It is formed by the junction of two small streams—the Beldon and Knuckton Burns—which unite about a mile west of Blanchland, and is about twenty-five miles in length, with a watershed having a total area of about 200 square miles. For the first twenty miles or so of its length it forms the boundary between the counties of Northumberland and Durham. The valley, which is noted for its scenic beauty, is rich in floral treasures, and seems to be particularly so in the Orchid family, fourteen species out of twenty-one recorded British ones being found within its limits. Its geological structure is the Millstone Grit in its upper portion and the Coal Measures in its lower portion, with a small area of Carboniferous Limestone (Fell-top Limestone) between them near the centre of the valley. The following is a list of the species of Orchids found in the valley, the result of my own personal observation. The letters D. and N. appended after the localities signify that the places are in Durham or Northumberland, and the figures 1, 2, 3 that the strata on which they grow is (1) Millstone Grit, (2) Carboniferous Limestone, and (3) Coal Measures.

Malaxis paludosa Sw. Muggleswick Common (D. 1).

Neottia Nidus avis Rich. The Sneepe (N. 1 and 2); near Alansford on both sides of the Derwent (D. 2 and N. 2); rare.

Listera cordata R.Br. Beldon Moor (D. 1); Blanchland Common (N. 1); Edmundbyers and Muggleswick Moors (D. 1 and 2).

Listera ovata R.Br. The Sneepe (N. 1 and 2); and Muggleswick Woods (D. 1 and 2).

Epipactis latifolia All. In Gibside Woods (D. 3); Chopwell Woods (D. 3); woods near Shotley Bridge (D. 3 and N. 3); woods near Muggleswick (D. 1 and 2).

Orchis Morio L. In Chopwell Woods (D. 3); in Hamsterley Woods (D. 3); in woods near Shotley Hall (N. 3); in woods near Muggleswick (D. 2); in thickets near the Sneepe (N. 2).

Orchis mascula L. Frequent in woods and pastures at Chopwell (D. 3); Medomsley (D. 3); Shotley (N. 3); Muggleswick (D. 1 and 2).

Orchis latifolia L. In damp pastures near Swalwell, Lintzford, Shotley Bridge (all D. 3); and at the Sneepe (N. 1 and 2).

Orchis maculata L. Common in damp pastures throughout the valley.

Habenaria conopsea Seuth. Frequent in meadows and dry pastures at Gibside and Medomsley (D. 3); and Shotley (N. 1).

Habenaria bifolia R.Br. On pasture lands at Medomsley (D. 3); Shotley (N. 2).

Habenaria chloroleuca Rid. At Gibside (D. 3); Medomsley (D. 3); Shotley (N. 3); Muggleswick (D. 1); Greenhead (N. 1); Edmundbyers (D. 1); Hunstanworth (D. 1); and Blanchland (N. 1).

Habenaria viridis R.Br. The Sneep (N. 2); Muggleswick Moors (D. 1); Edmundbyers (D. 1); Blanchland (N. 1).

Habenaria albidia R.Br. Knucklton Burn (D. 1); Blanchland Common (N. 1).

DIATOMS NEAR GRIMSBY.

ARTHUR SMITH, F.L.S., F.E.S., ETC.,

Hon. Secretary and Curator of the Grimsby and District Naturalists' Society.

THE following species were recently collected by myself, and have been placed on one of a series of 'type slides,' now being prepared towards obtaining a representative set of Lincolnshire Diatoms. The specimens were taken from a series of filtered dippings in Clee Parish, some from the algæ-covered sides of the trough of a spring, others from a brook near by.

The specimens occurring under this half-inch of cover glass are enumerated below and have been confirmed by Mr. W. J. Wood, F.R.M.S.

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| <p>Cymbella affinis Kutz.
 Stauroneis Legume Ehr.
 Stauroneis Smithii Grun.
 Stauroneis anceps Ehr.
 Navicula amphirhyncus Ehr.
 Navicula lanceolata Kutz.
 Navicula gregaria Donk.
 Navicula cuspidata Kutz.
 Navicula amphibæna Bory.
 Pinnularia Brebissonii Kutz.
 Pinnularia viridis Kutz.
 Vanheurkia rhomboides
 var. Saxonica Rab.
 Pleurosigma Spencerii
 var. Smithii Grun.
 Pleurosigma acuminatum Grun.
 Pleurosigma attenuatum W.Sm.
 Gomphonema parvulum Kutz.
 Rhoicosphenia curvata Grun.
 Achnanthidium flexellum Breb.
 Achnanthes microcephalum Kutz.
 Eunota gracilis Ehr.
 Synedra ulna Ehr.
 Synedra ulna var. vitrea.
 Fragilaria construens Ehr.
 Fragilaria construens var. binodis.</p> | <p>Fragilaria construens var. venter.
 Fragilaria capucina Desm.
 Meridion circulare Ag.
 Diatoma vulgare Bory.
 Diatoma elongatum Ag.
 Diatoma hiemale Heib.
 Surirella ovalis Breb.
 Surirella ovalis var. minuta Breb.
 Surirella ovalis
 var. pinnata W.Sm.
 Surirella ovalis
 var. Brightwellii W.Sm.
 Surirella ovalis var. apiculata.
 Surirella bifrons.
 Surirella ovata Kutz.
 Surirella linearis W.Sm.
 Cymatopleura Solea W.Sm.
 Cymatopleura Solea
 var. apiculata W.Sm.
 Nitzschia dissipata Grun.
 Nitzschia acuminata Grun.
 Nitzschia angustata Grun.
 Nitzschia paradoxa Grun.
 Nitzschia Denticula Grun.
 Hantzschia amphioxys Ehr.</p> |
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Naturalist,

REVIEWS AND BOOK NOTICES.

The Flora of the Liverpool District, illustrated by Drawings and Photographs. Edited by **C. Theodore Green, M.R.C.S.**, etc. Liverpool, D. Marples & Co., 1902. Price 5s.

This work gives localities for over 1,060 species, of which 804 are figured by Miss E. M. Wood; and 14 photographs, some of which could have been made to serve a scientific purpose, are reproduced as illustrating the scenery of the district. There is an introduction of eight pages; and a chapter is appended by Mr. J. J. Fitzpatrick, who contributes seven pages on the geology of the district, and Rev. J. Cairns Mitchell,



Hightown Sandhills.

who supplies 22 pages of valuable meteorological notes and tables. The Phanerogams, Pteridophyta, and Characeæ recorded grow 'within fifteen miles of the Liverpool Town Hall, and two miles of Southport.' This area at first sight seems very unnatural; but if the mountain limestone area of Flintshire had been left out of account, as it might well have been, the unnaturalness would have been more apparent than real. There would then have been left a lowland district, with underlying rocks all of sandstone—Coal Measures, Bunter, and Keuper, sometimes obscured by glacial clay, peat, and coast sand. Such an area affords a capital opportunity of studying

the effect of the subsoil on vegetation; and it is greatly to be regretted that the editor and his committee have not discussed this and similar problems. In fact, the absence of a descriptive account of the district from the botanical point of view constitutes the greatest blemish of, what is in many respects, an excellent flora. The definitions given of 'denizen,' 'colonist,' 'casual,' and 'alien' reveal on the part of Liverpool naturalists a painful apathy concerning the work of the late Mr. H. C. Watson. It is iterated with provoking frequency that certain species, e.g., *Clematis*, *Pyrus Aria*, *Lycium*, *Galun-*



Water-Lilies near Bromborough.

thus, and *Larix* are denizens, but 'always planted' or 'always introduced.' Even on the inaccurate definition of denizen given—'a plant of non-British origin, whether naturalised or not'—the flora is by no means consistent. After this looseness, the editor has only himself to blame if his readers are inclined to doubt whether *Viola carpatica*, recorded from rail-banks and waste places about the mosses, is really, as he states, a native, and if the student of plant distribution who wishes to ascertain the geographical limits of species fails to find the book of real help. It is a matter of surprise that in

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a book intended for field botanists the nomenclature of the 8th, rather than that of the latest, London Catalogue should have been followed. A speciality has been made in recording ballast plants; and it is interesting to learn that while most of these only find a temporary home, yet some others show signs of becoming naturalised. A list of the latter plants in the introduction would have been of value. It is stated that during the last thirty years some species have become extinct, or much more scarce, and three reasons are given to account for the fact—growth of population, better farming, and ‘depredations of fern and herb gatherers, and also of unwise field botanists.’ There are probably other causes which the editor does not state; and seeing that records date from Withering’s *Flora* (1776-1818), these too brief observations could profitably have been extended over more than thirty years. The figures are so delightfully clear that it seems a pity that they were not made of even more service to field botanists. This could have been done by the addition of sketches of characteristic parts, e.g., roots, tubers, radical leaves, and fruits; and by giving dissections of the more minute organs. Very occasionally Miss Wood has done these things, and then mostly with success. Drawings of allied species are most helpful in identifying allied species; and though such are often given, there are exceptions (e.g., *Ranunculus Lenormondi* and *R. hederaceus*, *Betula alba* and *B. glutinosa*, *Potamogeton natans* and *P. polygonifolius*). Occasionally varieties are figured, and the drawings of *Juncus congesta* and *J. umbellata* are decidedly good; but not much essential difference is discernible between the figures of *Eriophorum angustifolium* and *E. latifolium*. The stipules of *Prunus Cerasus* are not shown, though usually the figures are well done. Several ballast introductions are figured, perhaps for the first time in this country. These include *Echinosperrum lappula* and *Asphodelus fistulosa*. On the whole, the Liverpool botanists are to be congratulated on the appearance of their ‘*Flora*,’ which is well got up in every way, and in which the species are accurately determined and carefully localised. We are indebted to Dr. Green for the illustrations here given.

C. E. M.

Amongst other valuable additions to the Union’s library received are:—‘The Annual Report of the U.S. National Museum,’ ‘Smithsonian Institution,’ 1900, a substantial volume of great value to naturalists and those interested in museums; the ‘Proceedings of the Philadelphia Academy of Natural Sciences,’ also illustrated with numerous plates; and *Blackwood’s Magazine* for March, which contains an article by Mr. E. Robinson, ‘Winter on the South Downs,’ of interest to ornithologists.

'The Lepidoptera of the British Islands.' C. G. Barrett, F.E.S. Vol. VIII. London: Lovell Reeve & Co. 1902. This is a further contribution to the histories of the Geometrina, and comprises the large families *Acidaliiidæ* and *Larentiidæ*. The numerous species are treated in the same exhaustive manner as in the previous volumes, the life histories, descriptions of local and casual variation, &c., being almost everything that can be desired. In a few species the matter is not quite up to date, as in the case, for instance, of *Hypsipetes elulata*, where little is said about the striking forms of the South-west Yorkshire moors, where probably the most beautiful forms in Britain occur, and where the range of variation is infinite. We notice the same omission, too, regarding the striking forms of *Cidaria immanata* and *C. russata* which occur in the same district, and, so far as we know, nowhere else in Britain. True, some of the forms are figured in the coloured plates representing the species; but as one edition of the book is without plates there is, of course, in it no allusion to them. The coloured plates are for the most part excellent, though here and there the 'browns' are a little too pronounced. One or two errors, too, have crept in, as in the figures of *Oporabia filigrammaria*, where an extraordinary buff-coloured variety from Dunford Bridge, Yorkshire, and belonging to a Yorkshire lepidopterist, is credited to a London entomologist, and *vice versa*. Still, these are minor matters, and detract comparatively little from the value of the work. Yorkshire lepidopterists, too, will be glad to find that specimens from their county figure fairly largely in the illustrations. Altogether the book, so far as it has gone, is by far the best of its kind we have, and will probably remain such for many years to come. When completed, it will be too expensive for possession by the majority of lepidopterists, but for that reason it ought to be on the shelves of every Free Library, and, of course still more so, in the library of every Natural History Society and Field Club.—G. T. P.

Catalogue of the Lepidoptera of Northumberland, Durham, and Newcastle-upon-Tyne. By John E. Robson, F.E.S. The first part of this list appeared in May 1899; and we have now received the second part, which has just been issued. To call the work a catalogue or list, however, is somewhat misleading, as in reality it is a good deal more than either. An account—forming almost a short chapter—is given of each species, representing, we suppose, nearly all that is known of it in the large area treated of. We say 'nearly all,' because we feel sure a good deal must also be known on a subject in which almost every lepidopterist is now specially interested, but which is largely neglected in this work. We allude to 'local variation.' We know of course that the extraordinary melanism in so many species which seems to be so rapidly spreading and increasing in Yorkshire and Lancashire, has not yet made itself felt to any extent in the more northern counties; but that very many of the species in Northumberland and Durham do differ considerably from their brethren in southern counties, especially where there is but little melanism, we have no doubt, and a comparison with these would have been not only interesting but extremely valuable. At the same time, as the general information given on each species goes far beyond what is found in most county lists, it may have been deemed inadvisable to still further extend it. The first part of the work reached to the end of the Noctuidæ; the second part is devoted entirely to the Geometrina. The Micro-lepidoptera are still to chronicle, but when completed, we think, the catalogue will rank among the best of our county lists. When it is finished we shall hope to notice it again in a critical comparison with the 'List of Yorkshire Lepidoptera,' the supplement to which will, we hope, by that time also have been published.—G. T. P.

An account of the fish in the freshwater aquarium, the Dobrée collection of Noctuidæ, etc., appears in Hull Museum Publications, No. 12, just issued. (A. Brown & Sons, Hull. 1d.)

Under the editorship of Mr. J. Lomas the Liverpool Geological Society has issued a valuable number of Proceedings, containing three papers of interest to Lancashire and Cheshire naturalists. The first is a useful record of sections exposed in the Heysham Harbour excavations, etc., by Mr. T. Mellard Reade, who has once more been favoured with a 'list of foraminifera' by Mr. Joseph Wright. Mr. W. Edwards gives a concise account of the drifts in the neighbourhood of Crewe, and Mr. H. C. Beasley continues his excellent work amongst the Triassic footprints. This is a description, with figures, of two curious four-toed prints. The papers of more general interest are by Mr. C. C. Moore, Mr. T. H. Cope, Prof. T. G. Bonney, and Mr. J. Lomas. There are several 'plates,' some of which, however, are rather crude.

Messrs. Macmillan & Co. have recently reprinted Prof. L. C. Miall's 'Aquatic Insects.' Since the appearance of the work in 1895 (see *Naturalist*, 1896, pp. 51-52) it has been largely read, and has unquestionably done much towards inducing field naturalists to take an interest in this somewhat neglected branch of natural history. The reissue of the work has given the author an opportunity of adding two pages of 'additional notes,' mostly references to works published since the first issue. 'The Natural History of Aquatic Insects' is already well known to most of our readers, but those who have not had the pleasure of perusing its pages should not fail to take the earliest opportunity of doing so, particularly as the author has been greatly assisted in his work by well-known Yorkshire naturalists.

'The Natural History Transactions of Northumberland, Durham, and Newcastle-upon-Tyne' (Vol. 14, Part 1, 1902), just to hand, contain several valuable papers, and we must congratulate the society on the decidedly local flavour of its proceedings. Dr. G. S. Brady writes:—'On Copepoda and other Crustacea taken in Ireland and on the North East Coast of England' (plates), and also 'Report on Dredging and other Marine Research off the North East Coast of England in 1901'—papers which should be perused by all interested in marine zoology. Mr. J. G. Baker gives 'Biographical Notes on the early Botanists of Northumberland and Durham,' which forms a valuable continuation of his address on 'Yorkshire Botanists,' delivered at the Barnsley meeting of the Yorkshire Union in 1884. The presidential address of Mr. T. Thompson contains a review of the year's field work, and also contains some interesting ornithological matter.

'Thoroughbreds and their Grass-land,' No. II., by the Rev. E. A. Woodruffe Peacock (Louth, 16 pp., 1902) has just been issued. It enters 'a little more fully into matters of general interest to horse-breeders.' It is sold at the more reasonable price of 6d.

A paper in the Linnean Society's journal (Zoology, Vol. 28) by Professor G. S. West deals with a branch of micro-zoology too much neglected by English observers—'Freshwater Rhizopods and Heliozoa.'

Among many interesting observations, perhaps the most striking is that in which Mr. West describes *Vampyrella lateritia* seen in the act of making burglarious entry by perforation of the cell wall into a filament of Mougeotia, and feeding on the enclosed protoplasm and chromatophore.

The author describes 68 species found in Britain by himself, including six which have not previously been described. Of these two (*Gromia stagnalis* and *Acanthocystis paludosa*) are recorded from Lincolnshire and Yorkshire localities. One form described is referred to a new genus. (*Leptochlamys ampullacea*). The figures are well drawn and the paper will be invaluable to students of these obscure forms of life.

FIELD NOTES.

MAMMALS.

***Bos primigenius* in Holderness.**—A collection of bones of *Bos primigenius*, from the peat at Kilnsea, near Spurn, has been presented to the Hull Museum by Mr. J. W. Webster. The specimens include several vertebræ (including the atlas), scapula, radius and ulna, ribs, etc.—T. S.

BIRDS.

Black Kite near Whitby: a Correction.—With reference to the record of the Black Kite near Whitby, in the January issue of *The Naturalist* (p. 29), which appears to have been inserted under a misapprehension, Mr. Eagle Clarke and I have examined the bird and find it to be a Montagu's Harrier, *Circus pygargus* (L.).—T. H. NELSON, Redcar, 10th March 1903.

MOLLUSCS.

***Testacella scutulum* in North Lincolnshire.**—On the 17th of December I received a young *Testacella* from Miss Susan Allett, Caistor. My friend Mr. J. W. Taylor has named it, and says 'It is undoubtedly *T. scutulum*, and therefore an addition to the fauna of North Lincolnshire.' It was taken in the garden of Nettleton House, which is in Caistor Parish.—E. ADRIAN WOODRUFFE PEACOCK, Cadney, Brigg.

Yorkshire Fusi.—A good deal of confusion exists in Yorkshire lists between *Fusus Islandicus* Chann. and *Fusus gracilis* Da Costa. This is primarily due to the fact that in Sowerby's Index of British Shells, which was much used by collectors forty years ago, *F. gracilis* is called *F. Islandicus*. Accordingly, Ferguson records *Islandicus* for Redcar, and the Rev. J. Hawell, in his List of Cleveland Shells (Proc. Cleveland Nat. Field Club), falls into the same snare, and records 'dead shells from Staithes.' The true *Fusus Islandicus* Chann. is a very deep-water shell, of which only two or three British examples are known—it is, in fact, abysmal, or nearly so. I do not think there is the slightest doubt that it was *F. gracilis* Da Costa that Ferguson took from the Redcar boats and Mr. Hawell found at Staithes. Neither of these collectors mention *F. gracilis*, and it is not very rare on the fishermen's lines at any of the Yorkshire fishing stations, though much less common than *F. antiquus*.—W. C. HEY, 9th February, 1903.

HYMENOPTERA.

Bedeguar Galls at Caythorpe, Div. 13, S. Lincs.—This gall is frequent on the wild rose (*Rosa canina*) almost everywhere, but, I think, seldom in such quantity on one rose-bush as it was on one I saw on the roadside between Court Leys and Caythorpe on 15th November. The bush is on the grass away from the hedge, and is about 5½ ft. high and 4 ft. through. There were 46 new galls upon it, and the remains of some belonging to season 1901. Each gall contains many larvæ, and is caused by the puncture of a small insect (*Rhodites rosæ*). On 5th February I found that many of these galls had been broken open by birds, and the inmates extracted.—S. C. Stow, Grantham, 9th February, 1903.



LEPIDOPTERA.

***Plusia bractea* Fb. at Doncaster.**—Among some insects brought to me to be named, last week, was a specimen of the above-named species. Its captor, Mr. E. B. Tonkinson, tells me that he took it at flowers of Clematis, on 15th August 1902, along with *P. gamma*. It seems to me to be a very remarkable capture, *bractea* being usually considered to be a high moorland species, and rare at all times.—H. H. CORBETT, Doncaster, 9th March 1903.

Plusia bractea was exceptionally abundant in its known localities in Scotland and Ireland last year: a lepidopterist friend told me he 'could net them faster than he could box them,' so it is perhaps not extraordinary that one should wander to Doncaster.—G. T. P.



COLEOPTERA.

***Pogonocherus bidentatus* Thoms. near Doncaster.**—I took a specimen of this species at Dodworth, on Thursday, the 5th inst. It is, I believe, rare in Yorkshire.—H. H. CORBETT, Doncaster, 9th March 1903.

***Ocypus similis* F. near Doncaster.**—I was collecting in Arncliffe Lane, near Doncaster, in late summer 1902, and in a sand-pit under a log of wood I captured one specimen of *Ocypus similis* F. It is not included in Hey's list, and Fowler mentions the peculiarity that it does not occur between the south-eastern and the northern counties. For these reasons I thought it was worth recording.—H. V. CORBETT, Doncaster, 24th February 1903.

FLOWERING PLANTS.

***Cerastium tetrandum* near Liverpool.**—Recent confirmation of this species is asked for in the lately published 'Flora of Liverpool District.' It occurs abundantly throughout the sand-dune tract in both Cheshire and South Lancashire, extending northwards to West Lancashire, where also it is plentiful on the coast of the Fylde area. A few specific localities may be named and might be readily doubled:—West Kirby, Wallasey, Seaforth, Hightown, Southport, and Lytham.—J. A. WHELDON, Liverpool.

***Rubus macrophyloides* in Cheshire.**—This somewhat uncommon bramble (*R. macrophyloides* Genev.) occurs plentifully in Eastham Wood, Cheshire, growing amongst *R. rosaceus* var. *silvestris* R. P. Murray. The similarity in shape of the leaves of these two plants has no doubt contributed to the plant now first recorded for Cheshire being overlooked. Mr. Rogers named my specimens; and '*forma umbrosa*' appended by him to the name is easily accounted for by the nature of the habitat—a densely-shaded oak wood.—J. A. WHELDON, Liverpool.

***Omphalodes verna* in Forge Valley.**—This lovely plant—a native of north Europe—has somehow or other become naturalised in Forge Valley. My eye was caught by its large and brilliant flowers last spring. It has probably been brought down from some garden at Hackness by the river Derwent.—WM. C. HEY, 9th February 1903.

***Sambucus Ebulus* at Ropsley, Div. 15, S. Lincs.**—Last August I saw Dane's Elder (*Sambucus Ebulus*) in abundance near Ropsley village, Div. 15. On visiting the locality again at the end of September in the hope of taking some seeds, I found that three small berries were the sole crop. This is only the seventh record for the county. A common Elder (*Sambucus niger*) close to was laden with berries, one branch also bearing fully opened flowers (30th September).—S. C. STOW, Grantham, 9th February 1903.

***Saxifraga stellaris* in Durham.**—On 4th July 1902 I found the Starry Saxifrage (*Saxifraga stellaris*), a somewhat rare wild plant in Durham, growing in some profusion near Bollihope, in Weardale.—J. W. FAWCETT, Darlington.

***Salvia verticillata* at Birkenhead.**—This handsome alien flowered freely in waste ground near the Birkenhead Docks this summer (1902). It has been reported from the Lancashire portion of the area embraced by the Flora of Liverpool, but is apparently new to the Cheshire side of the Mersey. It is a native of South Europe.—J. A. WHELDON, Liverpool.

NORTHERN NEWS.

The paragraphs in our issue of January as to the indiscriminate slaughter of birds for profit were intended to apply to the practice and not to any particular individual. We have heard from a trustworthy local authority that Mr. Clarke, of Scarborough, has been for the last twelve years a valued and helpful member of the local Field Naturalists' Society, of which he has occupied the presidential chair.

Our attention has been called to an advertisement, emanating from Grasmere, in which 'large clumps' of Parsley Fern are offered at 1s. per dozen, or 6s. *per cwt.* If these are wild ferns, as is probably the case, it is perhaps as well to point out how difficult it is to cultivate this species. We were hoping that the Lake District flora was well protected. We understand the matter has been brought under the notice of the Lake District Association, who are inquiring into it.

The members of the Hull Scientific and Field Naturalists' Club have undertaken a natural history survey of Hornsea Mere, and hope to publish the results of their work in a volume next year. The Secretary of the Club will be glad to have particulars of any finds made by members of the Union that are worthy of recording.

Of the 412 additions to the British Association's Geological Photographs' Committee's Collection during 1902, 88 are from Yorkshire, 21 from Cumberland, 16 from Westmorland, 6 from Durham, 3 from Derbyshire, and 1 from Lancashire. The greater part of these have been contributed by Mr. Godfrey Bingley, of the Yorkshire Geological Photographs' Committee.

Owing to the recent heavy landslips at Scarborough, the naval battery in the Castle Yard is considered dangerous, necessitating its removal.

The Ripon Corporation is considering the advisability of adopting the Museums Act, and taking over the museum and library belonging to the Ripon Naturalists' Club and Scientific Association.

We regret to record the death, on the 17th January, of Charles Donald Hardcastle, who has been so intimately acquainted with Leeds naturalists and geologists for many years. He was Vice-president of the Leeds Co-operative Naturalists' Field Club, and was a member since its formation fourteen years ago. He also passed through the presidential chair of the Leeds Geological Society. In a quiet way Mr. Hardcastle did much good work. He was born at Armley in 1824.

A detailed description of the Heaton Park Borehole, near Manchester, which reaches to a depth of 790 yards, is given by Mr. Joseph Dickenson in the 'Transactions of the Manchester Geological Society,' Vol. 28, Part 3, just issued.

La Feuille Des Jeunes Naturalistes for March (Paris) contains lengthy summaries of two papers appearing in our January issue, viz, that by Dr. W. G. Smith on 'Botanical Survey for Local Naturalists' Societies' and Mr. G. Massee's on 'The Modern Method of Studying Agarics.'

With reference to the note by Mr. Edward Peacock on Ringing Bees, which appeared in our March issue, Dr. C. F. George writes as follows:— 'I read with much pleasure Mr. Peacock's interesting paper on this subject, but am sorry that he has changed his opinion in consequence of the incident he relates. I have been a bee-keeper uninterruptedly for over forty years; it has been one of my hobbies during the whole of that time. I have interviewed some of the ringers alluded to by Mr. Peacock, and find that the event took place about midday, and that before commencing ringing their books, etc., were placed *on* the bee-stand, and near to the entrance of a hive!! I leave it to bee-keepers and naturalists to draw their own conclusions. *Verbum sap.*'

We have pleasure in drawing attention to the notice recently issued by the Clerk of the East Riding County Council in reference to the protection of birds and their eggs. The readers of this journal have every reason to be thankful for the interest taken by the Council in local bird life. The following is an extract from the circular:—

‘The time during which the killing or taking of Wild Birds is prohibited by the Act of 1880 shall be extended, so far as concerns the Administrative County of the East Riding of Yorkshire, so as to be *between the last day of February and the first day of September* in each year.

‘During the period between the 31st day of August in any year and the 1st day of March following the killing or taking of Wild Birds on Sundays is prohibited on the foreshore within the East Riding of Yorkshire, including the estuary of the Humber, and on the tidal portion of the River Hull.

‘The taking or destroying of Wild Birds’ Eggs is prohibited for a period of five years from the date of this Order (13th February 1903):—

‘(1) On the Promontory of Spurn, including Kilnsea Warren south of the line taken by the road leading from the village of Kilnsea towards the site of the Old Village of Kilnsea.

‘(2) On Hornsea Mere and the lands immediately adjoining, the boundary of which area commences at a point on the Hornsea and Seaton Road 7 chains east of Mill Lane, and proceeds in a south-easterly direction along the road past the north-east side of ‘Great Wassand’ for a distance of about 51 chains, thence along a footpath on the south side of the Mere to Lelly Lane, thence north-easterly for $1\frac{1}{4}$ chains along the north side of Lelly Lane, thence in a north-westerly direction along the boundary fence dividing property belonging to Mr. William Bethell and Mr. Constable to the Mere, thence along the edge of the water of the Mere to and along a stream passing the west front of Ventnor House, to the Hornsea and Seaton Road, and then along the south side of the said road to the above-mentioned point 7 chains east of Mill Lane.’

It is pleasing to notice that the Leeds Naturalists’ Club shows signs of exceptional activity just now.

Mr. Edward Bailey, of Mansfield, has presented an extensive and valuable collection of Natural History specimens to his native town as a nucleus of a museum.

The Back Bequest has been granted by the Royal Geographical Society to Dr. Wm. G. Smith, of the Yorkshire College, Leeds, for his papers and maps on ‘The Geographical Distribution of Vegetation in Yorkshire.’

The schools in East Yorkshire are interesting themselves in the ‘Bird and Tree Day Competition’ instituted by the Society for the Protection of Birds. The handsome silver challenge shield given by the society is at present held by the St. Mary’s Boys’ School, Hull.

The *Eastern Morning News* records that a female Otter, weighing 12 lbs., was caught near Driffield in February. A dog Otter was captured in the same stream the previous season. The same paper records the appearance of a Seal at Bridlington early in March, and the capturing of a Badger at Driffield about the same time. In the *Yorkshire Weekly Post* Mr. W. Morris records a Cormorant near Sedbergh on 7th March, and Mr. Duckworth records a Bewick’s Swan on the Spilway Marshes on 28th February 1903.

The Rev. W. J. Wingate, of St. Stephen’s Vicarage, Bishop Auckland, has issued an appeal for the names and addresses of Durham residents interested in Natural History, for the purpose of forming a Union of Durham Naturalists on the lines of the Yorkshire Union. We trust that those interested in the subject will forward their names to Mr. Wingate.

Naturalist,

WEST YORKSHIRE BOTANICAL NOTES.

LISTER ROTHERAY.

Long Preston.

THE following list of West Yorkshire plant localities is intended to serve as a complementary one to 'Lees' Flora of West Yorkshire.' Those marked with an asterisk * are new additions to the river drainage areas in which they occur, whilst the others, though additional records, mostly show their wider distribution in their separate drainage areas than is given in that excellent work. On this account they will perhaps prove interesting to West Yorkshire botanists generally, as showing that many species therein given have a wider range of occurrence than is often supposed. Some few records are not my own; in such cases the authority for them is given, specimen plants having either been shown or given to me from the localities named in corroboration of the truth of the record. With these few exceptions the others are my own observations. The arrangement of the species is that of the 9th edition of the 'London Catalogue of British Plants.'

Thalictrum collinum Wall. Small gill at Coniston-with-Kilnsey. Limestone escarpment at Skirethorns, near Threshfield, Wharfedale.

VAR. ***calcareum*** (Jord.). Small gill at Coniston-with-Kilnsey. Limestone escarpment at Skirethorns, near Threshfield, Wharfedale.

****Thalictrum flavum*** Linn. Heslaker Lane, Broughton. Meadow border by river Ribble at Long Preston.

****Ranunculus trichophyllus*** Chaix. Otterburn Beck, Bell Busk.

Ranunculus Flammula L. var. ***radicans*** Nolte. Marshy ground by Ribble at Long Preston.

Ranunculus Lingua L. Old bed of river Aire, near Gargrave.

Ranunculus auricomus L. Roadside between Wigglesworth and Hellifield.

Trollius europæus L. Ditch margin at Wigglesworth.

Aquilegia vulgaris L. Rocky limestone gill between Litton and Halton Gill in Littondale. Roadside bank beyond Wigglesworth going to Paythorne.

Actæa spicata L. Limestone crevices west of Sulber Nick, between Selside and Clapham.

- Berberis vulgaris* L.** Very plentiful in Buckden Woods, but, like many others, planted there.
- Nymphæa lutea* L.** Very abundant in Ribble opposite Long Preston.
- Papaver Argemone* L.** Noted for several years on the railway bank west of Skipton.
- Meconopsis cambrica* Vig.** In an old lane, close by a stile, leading across a meadow towards Inman Lodge, Upper Ribblesdale.
- **Nasturtium palustre* DC.** Ribble banks at Wigglesworth and Long Preston.
- Draba incana* Linn.** Limestone escarpment near Heights Farm, Skirethorns, near Threshfield.
- Cochlearia officinalis* L.** Banks of Scaleber Beck, from the Force to its junction with the Ribble.
- Cochlearia Armoracia* L.** Refuse heap and on a piece of waste ground in Long Preston village.
- Hesperis matronalis* L.** Known for many years in a hedge at Stirton, Skipton.
- **Sisymbrium Thalianum* J. Gay.** Wall top at Wigglesworth. Plentiful at Long Preston.
- Sisymbrium Sophia* L.** Farmyard at High Bradley, near Skipton.
- Erysimum perfoliatum* Crantz.** Manure heap from corn mill, in The Ings, Skipton.
- Diplotaxis tenuifolia* DC.** Established for several years on the railway embankment (Colne Section) about a mile beyond Skipton.
- Lepidium rudemale* L.** Waste ground in a pasture near to Hawbank, Skipton.
- Lepidium Draba* L.** Established for many years on the railway bank to Gargrave, just beyond Skipton.
- Thlaspi arvense* L.** Found several times on the railway banks beyond Skipton, and once on the roadside leading from Bell Busk to Coniston Cold.
- Viola palustris* L.** Boggy places on moor between Long Preston and Settle.
- Viola odorata* L.** Hedgebank in old lane near Conscience Farm, Long Preston.
- Viola lutea* Huds.** Roadside near Upper Settle, going to Long Preston, and pastures near to Scaleber Force.

- Cerastium glomeratum*** Thuill. Waste ground in a meadow and by roadside crossing over the moor to Settle, at Long Preston.
- Stellaria graminea*** L. Pastures by Ribble at Long Preston, and in pastures near to Scaleber Force.
- Arenaria verna*** L. South slope of Penyghent, at 2,000 feet elevation.
- Arenaria trenervia*** L. Roadside banks from Long Preston to Wigglesworth, and between the latter place and Helli-field.
- Sagina nodosa*** Fenzl. Damp hillside by Scaleber Beck at Long Preston, and wet ditchside by road between Ribblehead and Selside.
- Montia fontana*** Linn. *β. erecta* Pers. Small gill on the moor between Long Preston and Settle.
- Malva moschata*** L. Railway bank between Skipton and Gargrave.
- Linum usitatissimum*** L. Sewage field at Long Preston, in plenty, but only adventive.
- Geranium sylvaticum*** L. Rocky wood west of Ribblehead Station, in abundance. Railway bank between Giggleswick and Clapham.
- ****Geranium pratense*** L. Common about Long Preston and district.
- Geranium columbinum*** L. Small gill behind Coniston-with-Kilnsey.
- Geranium lucidum*** L. Old walls near Wigglesworth.
- Euonymus europæus*** L. Wood at Swilla Bottom, Ingleton.
- Rhamnus catharticus*** L. Wood at Swilla Bottom, Ingleton.
- ****Acer campestre*** L. Two small trees in hedge between Wigglesworth and Hellifield.
- Genista anglica*** L. Moor above Long Preston among the heather.
- Genista tinctoria*** L. Very abundant in the railway cuttings from Skipton to Long Preston, and between Giggleswick and Bentham.
- Ulex Gallii*** Planch. Observed on a shaly pit-hill at Egypt, near Thornton, Bradford, in September 1891, in full flower.
- ****Medicago denticulata*** Willd. *β. apiculata* (Willd.). Grain refuse heap from corn-mill at Skipton.

- Medicago arabica*** Huds. Waste ground in cornfield at Woodhouse Hill, North Bierley.
- ****Trifolium arvense*** L. Very abundant on the railway bank north of the viaduct, Dentdale Head, in August 1897.
- Anthyllis vulneraria*** L. Exceedingly plentiful in the railway cuttings between Clapham and Bentham.
- Lotus uliginosus*** Schkuhr. Roadside, near Halton West, going towards Wigglesworth.
- Prunus domestica*** Linn. In September 1900 I found this species in fine fruit in the gill by the church at Kirkby Malham.
- Prunus Avium*** L. Gill at Kirkby Malham.
- Prunus Padus*** L. Hedge by roadside between Hellifield and Wigglesworth.
- Spiræa Filipendula*** L. Dry, rocky pasture, west of Grass Wood, towards Coniston-with-Kilnsey.
- ****Potentilla rubens*** Vill. Rocky wood, half a mile west of Ribbleshead Station.
- Rosa pimpinellifolia*** L. f. ***spinosissima*** L. Limestone scars in Sulber Nick, and among heather on Ingleborough Fell. Also in Linn Gill. Very common in Grass Wood, Grassington.
- Rosa arvensis*** Huds. Very common about Hunsworth and Oakenshaw, where it supersedes *R. canina*.
- Parnassia palustris*** L. Wet places in Scaleber and Bowgillber Gills, between Long Preston and Ryeloaf Hill. Also near Crummack Farm, top of Crummack Dale.
- Sedum villosum*** L. Margin of Cam Beck near the old County Bridge, top of Linn Gill. Moist rocks by roadside between Darnbrough and Malham Tarn House.
- Hippuris vulgaris*** L. Watery places on margin of river Ribble at Long Preston.
- Myriophyllum spicatum*** L. Wigglesworth Beck, before it enters Ribble, in plenty.
- Myriophyllum alterniflorum*** DC. Wigglesworth Beck and stream draining wet land between Ribble and Wigglesworth Hall.
- Ægopodium Podagraria*** L. Hedgebank in old lane at Long Preston.
- Myrrhis Odorata*** Scop. Plantation at Wigglesworth, one plant.

- **Silau flavescens* Bernh. Roadside between Ribble and Hellfield at Long Preston.
- **Valerianella dentata* Poll. Cornfield border, near Huns-
worth Wood, North Bierley.
- Antennaria dioica* R.Br. Pasture on west side of Crummack Dale, near Norber. Ingleborough Fells, among the heather. Pasture above Gordale going towards Cove.
- Gnaphalium uliginosum* L. Drain margin at Wigglesworth, and Ribble bank, Long Preston.
- Gnaphalium sylvaticum* L. Margin of Ribble at Long Preston.
- Xanthium spinosum* L. Waste ground at Horton, Bradford. Shown to me by Mr. J. Beanland.
- Senecio viscosus* L. Waste ground about disused coal pits in plenty, at Beeston, Leeds.
- Senecio erucifolius* L. Canal bank from East Marton, towards Barnoldswick.
- Carlina vulgaris* L. Bowgillber Gill, Long Preston.
- Serratula tinctoria* L. Bushy pasture, near Kettlewell, and Grass Woods, Grassington, in plenty.
- Centaurea Cyanus* L. Cornfield at Oakenshaw, North Bierley.
- Campanula latifolia* L. Thicket by Ribble at Wigglesworth, and Grass Wood, Grassington.
- **Campanula persicifolia* L. Roadside between Skipton and Embsay.
- **Lysimachia vulgaris* L. Thicket by Ribble at Wigglesworth.
- Lysimachia Nummularia* L. Border of small plantation at Wigglesworth, and small gill draining into Bowgillber Gill, between Long Preston and Ryeloaf Hill.
- Lysimachia nemorum* L. Very abundant in wet places and small rills in Bowgillber Gill.
- Erythraea Centaurium* Pers. Meadow border near Botterby Wood, Skipton. Plant shown to me by Mr. J. B. Kipling.
- Gentiana campestris* L. Sulber pastures, between Selside and top of Crummack Dale, and pasture bottom of Linn Gill, near to Nether Lodge Farm.
- Menyanthes trifoliata* L. Boggy place in heathy pasture on the moor above Long Preston. Ditchside in meadow near to Inman Lodge, Upper Ribblesdale.

- Borago officinalis* L. Observed several plants this summer (1902) on the ash-tip at Long Preston.
- **Lamium maculatum* L. Margin of old lane at Grassington.
- Chenopodium Bonus-Henricus* L. Waste ground at Long Preston, and roadside near Grassington.
- Daphne mezereum* L. Grass Woods, Grassington. I insert this on the authority of Mr. J. Crowther, who has a plant in his garden, obtained there fifteen years ago.
- Humulus Lupulus* L. Hedge in an old lane at Long Preston.
- Salix repens* L. Damp pasture by Ribble between Ribblehead and Thorns Gill. Damp hillside bordering Scaleber Beck, and very common among the heather on the moor above Long Preston.
- Juniperus communis* L. Plentiful in Sulber Nick, north of Crummack Dale.
- Epipactis latifolia* All. Ingleton Fell towards Chapel-le-Dale.
- Habenaria conopsea* Benth. Roadside between Wigglesworth and Paythorne in plenty.
- Habenaria albida* R.Br. Meadow near Brow Gill Cave.
- Habenaria viridis* R.Br. Damp pasture between Ribblehead and Thorns Gill, and also pasture above Wharfe village in Crummack Dale.
- Habenaria bifolia* R.Br. Meadows near Hellifield and by roadside between Wigglesworth and Paythorne, abundant.
- Habenaria chloroleuca* Ridley. Pasture adjoining Thorns Gill and near Nether Lodge, bottom of Linn Gill.
- **Narcissus Pseudo-narcissus* L. Meadow at Meer Syke Farm, going from Wigglesworth to Clitheroe.
- Polygonatum officinale* All. Wood near Pecca Falls, Ingleton.
- Convallaria majalis* L. Limestone Scars in Sulber Nick. Wood west of Ribblehead Station and Ingleborough Fells, towards Chapel-le-Dale, in abundance.
- Allium vineale* L. Shore of Eshton Tarn, Gargrave. Specimen sent to me by Miss L. Tranter.
- Narthecium Ossifragum* Huds. Heathy pasture on moor above Long Preston.
- Paris quadrifolia* L. Noted one plant of this species growing by a block of Silurian rock near the top of Crummack Dale in May 1899.
- Luzula maxima* DC. Bowgillber Gill, Long Preston.

- Luzula erecta*** Desv. c. ***sudetica***. In the old lake bed top of Crummack Dale.
- ****Typha latifolia*** L. Marshy ground bordering river Wenning at Low Bentham.
- Sagittaria sagittifolia*** L. Canal between West Marton and Thornton-in-Craven, along with *Botanus umbellatus*.
- Potamogeton crispus*** L. Drain from wet land near to Wigglesworth Hall, and in the river Ribble at Long Preston.
- Scirpus cetaceus*** L. Margin of Scaleber and Bowgillber becks, and in the rills draining thereto. Margin of Ribble at Long Preston. Ditch between Hellifield and Wigglesworth.
- Scirpus lacustris*** L. River Ribble between Long Preston and Wigglesworth, in plenty. At Skipton, also in river Aire.
- Scirpus Caricis*** Retz. Boggy ground in Bowgillber Gill, above Long Preston.
- Carex pulcaris*** L. Boggy place between Broadwood and Swilla Bottom, Ingleton. Small gill on moor above Long Preston.
- Carex pilulifera*** L. Small gill draining into Scaleber Beck on moor above Long Preston.
- Carex pallescens*** L. Grassy border of Thorns Gill, near Ribblehead.
- Carex sylvatica*** Huds. Bastow Wood (higher part of Grass Wood), Grassington.
- Carex fulva*** Good. Grassy rill margin draining into Scaleber Beck, above Long Preston.
- Melica nutans*** L. Bastow Wood, Grassington. Linn Gill.
- Polystichum lobatum*** Presl. Bowgillber Gill, Long Preston, on grit.
- Polystichum angulare*** Presl. Ingleborough Fell, towards Chapel-le-dale.
- Lastrea Oreopteris*** Presl. Fairly common in most of the small gills draining into Scaleber and Bowgillber becks above Long Preston. Also at Shipley Glen towards Baildon Moor.
- Lastrea Filix-mas*** Presl. c. ***paleacea*** Moore. Ditchside by road between Wigglesworth and Halton West, and sparingly in Bowgillber Gill along with the type.

Lastrea rigida Presl. Limestone pavement of Ingleborough, behind the Hill Inn, Chapel-le-dale. Have known the plant here above twenty years.

Phegopteris Dryopteris Fée. Wood between Shelf and Royds Hall going towards Norwood Green, along with *Scolopendrium vulgare*.

Phegopteris calcarea Fée. Ingleborough lower scars, behind Southerscales, in plenty. Also limestone crevices west of Sulber Nick, between Selside and Crummack Dale.

Phegopteris polypodioides Fée. Scrubby ground, amongst grass, on lowest scar of Ingleborough, west of Southerscales. The plants in this station differ from those of any other of the same species I have ever seen, the stipes being much shorter, whilst the frond is also much shorter and narrower and of a reddish-green colour. In fact, the tallest plants scarcely exceed eight or nine inches in height.

Equisetum maximum Lam. Bowgillber Gill, above Long Preston.

Equisetum sylvaticum L. Bradley Moor, near Skipton. Scrubby pasture near Nether Lodge, bottom of Linn Gill.

Equisetum limosum Sm. Abundant in the Ribble between Long Preston and Wigglesworth.

Lycopodium Selago L. Plentiful in the bend on the highest ridge of Ingleborough, opposite Chapel-le-dale, along with *Cryptogramme crispa*. Old lake bed between Clapham village and Norber.

Lycopodium clavatum L. Glassy slope of Ingleborough, near to Meer Gill.

Lycopodium alpinum L. Sparingly at the eastern corner of the bend of the highest ridge of Ingleborough, opposite Chapel-le-dale.

Selaginella selaginoides Gray. Wet places in Sulber Nick and Sulber pasture, adjoining head of Crummack Dale.



HORSETAILS.

***Equisetum hyemale* in Lincolnshire.**—Edmund Oldfield recorded *Equisetum hyemale* in 1829 for this county. It has not been seen since till Miss Susan Allett sent me it this season from a damp wood, 'River-head,' South Kelsey.—E. ADRIAN WOODRUFFE PEACOCK, Cadney, Brigg, 1st November 1902.

Naturalist.

BIBLIOGRAPHY :

Papers and Records published with respect to the Natural History
and Physical Features of the North of England.

GEOLOGY AND PALÆONTOLOGY, 1900.

Compiled and edited by

THOMAS SHEPPARD, F.G.S.

Particulars of papers, etc., omitted from the following list will be gladly received and included at the commencement of the 1901 Bibliography. Every effort will be made, however, to ensure these lists being as complete as possible.

The lists for 1901-1902 are ready and will be published as soon as possible, and it would render them more complete if editors of periodicals, secretaries of societies, and especially authors of papers in local journals, etc., would send copies to the editor at the Museum, Hull. Reprints and authors' separate copies should bear the name of the publication, the number of the volume or part, the *original* paging and the *actual* date of publication.

As regards dating, we would suggest to editors and secretaries that care be taken to give the actual date of publication on the wrapper of all parts of journals and transactions; there is often difficulty and uncertainty, and we might instance some Transactions as not even stating the *year* of publication of the various parts. Bibliographers would greatly appreciate attention to this point.

The Watsonian vice-counties are adopted throughout these bibliographies as more convenient and uniform in extent than the political counties; those comprised within the North of England are the following :—

53, Lincoln S.; 54, Lincoln N.; 56, Notts.; 57, Derby; 58, Cheshire; 59, Lancashire S.; 60, Lancashire W.; 61, York S.E.; 62, York N.E.; 63, York S.W.; 64, York Mid W.; 65, York N.W.; 66, Durham; 67, Northumberland S.; 68, Cheviotland; 69, Westmorland with Furness and Cartmel; 70, Cumberland; and 71, Isle of Man; with their adjoining seas.

Previous instalments of the Bibliography of Geology and Palæontology have appeared as follows :

For 1884, in 'Naturalist,' Dec. 1885, pp. 394-406.

„ 1885, „ Nov. 1886, pp. 349-362.

„ 1886, „ June 1888, pp. 178-188.

For 1887, in 'Naturalist,' Feb. 1889, pp. 61-77.

„ 1888, „ April-May 1890, pp. 121-138.

„ 1889, „ Nov. 1890, pp. 339-350.

„ 1890, „ Oct.-Nov. 1891, pp. 313-330.

„ 1891, „ July-Aug. 1892, pp. 219-234.

„ 1892, „ Sept. 1893, pp. 265-279.

„ 1893, „ Sept.-Oct. 1898, pp. 273-296.

„ 1894, „ March-April 1899, pp. 81-103.

„ 1895, „ Oct.-Nov. 1899, pp. 305-324.

„ 1896, „ June 1900, pp. 173-191.

„ 1897, „ Jan.-Feb. 1901, pp. 17-36.

„ 1898, „ Oct.-Nov. 1901, pp. 305-324.

„ 1899, „ Oct. 1902, pp. 317-336.

I have to thank Mr. W. Denison Roebuck, F.L.S., and Mr. Alfred Harker, M.A., F.R.S., F.G.S., for assistance.

1900.

ANON. [not signed].

YORKSHIRE, ETC.

British Association, Bradford, 1900. Catalogue of Temporary Museum in the Girls' Grammar School [includes several interesting Geological exhibits relating to Yorkshire, etc., lent by Mr. P. F. Kendall], 8 pp. 1900.

ANON. [not signed].

YORKSHIRE, ETC.

Geology at the British Association [a review of the work of Section C at the Bradford meeting, containing numerous references to Yorkshire Geology]. *Nature*, 11th Oct. 1900, pp. 587-588.

ANON. [not signed].

DURHAM.

An Erratic Boulder [on Dovefield Hill, near Crook Railway Station; a gabbro, weighing about five tons]. *Trans. Weardale Nat. Field Club*, Vol. 1, No. 1, 1900, p. 124.

ANON. [not signed].

YORKSHIRE.

Excursions | British Association | Bradford, 1900 [includes particulars of the Geology of the various places visited]. 1900.

ANON. [not signed].

YORKSHIRE.

British Association for the Advancement of Science. Bradford Meeting, 1900. Handbook. For the use of Members taking part in Geological Excursions. 6 pp., sections, etc.

ANON. [not signed].

NORTHUMBERLAND S.

The Northumberland Coalfield. *Coll. Guardian*, Vol. 79, 1900, pp. 63-64, 160-161, 208-209, 350, 400-401, 498-499.

ANON. [not signed].

DURHAM.

The Durham Coalfield. *Coll. Guardian*, Vol. 79, 1900, pp. 111-112, 303-304, 450-451, 543-544, 688-689.

ANON. [not signed].

LANC. S.

The Lancashire Coalfield. *Coll. Guardian*, Vol. 79, 1900, pp. 979-980, 1025-1026, 1078, 1126, 1219-1220.

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DURHAM.

[Note recording the erection of a large Shap Granite Boulder, weighing twelve tons, in the public park, Darlington, in memory of the late Dr. R. T. Manson]. *Nature*, 1st Nov. 1900, p. 11.

Naturalist,

ANON. [not signed]. NOTTINGHAMSHIRE.

British and Irish Building Stones. XI. Nottinghamshire [an account of the Liassic, Triassic, and Permian strata of Nottinghamshire from the point of view of their fitness for building purposes]. Building News, 21st Sept., Vol. 79, pp. 386-387.

ANON. [not signed]. LAKE DISTRICT.

Some Recent Papers by Professor W. M. Davis [reviewed; some physical features in the English Lake District attributed to troughs which have been deepened and widened by ice-action]. Geol. Mag., Dec. 1900, pp. 574-575.

ANON. [not signed]. NORTHERN COUNTIES.

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Obituary. George Highfield Morton, F.G.S. Born July 9, 1826. Died March 30, 1900. [Briefly refers to Morton's geological work in the Liverpool neighbourhood]. Geol. Mag., June 1900, p. 288.

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The Great Crosby Boulder [brief notice of this gypsum erratic; see "T. Mellard Reade" in the 1899 Bibliography]. Science Gossip, Jan. 1900, p. 246.

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E. C. ALDRIDGE. LANC. S., CHESHIRE.

Building Stones around Liverpool. Quarry, Vol. 5, 1900, pp. 325-327.

HUBERT JOHN ALLEN. FURNESS.

Iron and Copper Manufacture in Furness from the Earliest Times till the 19th Century [a paper read in February 1886]. Furness Lore: being Trans. Barrow Nat. Field Club for three years ending March 1882, printed 1900, pp. 128-132.

[G. L. APPERSON; Editor; not signed.] YORK S.E.

Driffield, in Yorkshire [the Museum at; notice of the catalogue prepared by Thomas Sheppard]. Antiquary, January 1901, p. 4.

LORD AVEBURY [SIR JOHN LUBBOCK]. YORK E. ETC.

Pre-historic Times as illustrated by Ancient Remains and the Manners and Customs of Modern Savages. Sixth edition. 1900.

JOHN BARKER.

DURHAM.

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J. BARNES AND W. F. HOLROYD.

DERBYSHIRE.

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[J.] BARNES AND [W. F.] HOLROYD.

DERBYSHIRE.

La Blue-John-Mine à Castleton (Angleterre) [describing mode of origin of the caves of the district and discussing the formation of the fluor-spar; the latter is considered to have been formed after the elevation of the Carboniferous Limestone, but before the deposition of the Permian; the cause of its colour is also discussed]. Mém. Soc. Spéléologie, Vol. 4, pp. 1-19.

F. A. BATHER.

YORKSHIRE, LANCASHIRE, ETC.

The Genera and Species of Blastoidea, with a List of the Specimens in the British Museum (Natural History) [includes particulars of the Gilberston collection from Lancashire and Yorkshire, the J. Rofes collection from Yorkshire, etc.], pp. x. + 70, 1899.

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ALEXANDER BEAZELEY.

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The Reclamation of Land from Tidal Waters [refers to the denudation of the coast; the accumulation of material in the Humber, etc.], pp. xii. + 314, 1900. Reviewed in Nature, 19th July, 1900, pp. 266-7.

B. S. BECKWITH.

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A Ten-Days' Driving and Walking Tour in the North-west Yorkshire Dales [brief geological notes]. Darlington; 24 pp.; 1900 [query, reprinted from local newspaper].

L. L. BELINFANTE.

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On the Structure of a Stem of a Ribbed *Sigillaria* [compares with specimens from Oldham and Halifax]. Rep. Brit. Assn. 1899 (publ. 1900), Dover Meeting, pp. 926-927.

THOMAS BLASHILL.

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Sutton-in-Holderness, The Manor, The Berewic, and The Village Community | by | Thomas Blashill, F.R.I.B.A. | . . | Cheap Edition | London [brief geological notes]. 1900; pp. iv. + iv. + xvi. + 302.

WILLIAM BOADEN.

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Microscopic Geology [a paper read in March 1880; very briefly refers to Derbyshire, Cumberland, etc.]. Furness Lore: being Trans. Barrow Nat. Field Club for three years ending March 1882, printed 1900, pp. 34-36.

J. W. BOND.

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Records of Investigations in the Carboniferous Strata of the Leeds District. Trans. Leeds Geol. Assn., Vol. 12, 1900, pp. 32-37.

T. G. BONNEY.

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[The Underground Waters of North-west Yorkshire. Part I. The Sources of the River Aire]. III. Report of the Chemical Subcommittee [gives results of tests of water charged with different solutions, after reappearing at the springs, etc.]. Proc. Yorks. Geol. and Polyt. Soc., Vol. 14, Part 1, 1900, pp. 13-21.

A. W. BRIGHTMORE.

LANC. S., CHESHIRE.

Floating Stones [pieces of earth, etc., noticed floating down the Mersey at ebb tide; probably having been detached from the banks during the quiescent period of high water]. Nature, 8th Feb., 1900, p. 346.

BENNETT H. BROUGH.

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The Duration of the British Coalfields [a review of 'Les Charbons Britanniques et leur épuisement,' by E. Lozé]. Nature, 7th June, 1900, pp. 124-125.

A. J. JUKES-BROWNE.

LINC. N. AND S., YORK S.E.

The Cretaceous Rocks of Britain. Vol. I.—The Gault and Upper Greensand of England [including the Red Chalk of Lincolnshire and Yorkshire; an account of this formation is given, with stratigraphical details and fossil lists; also chemical analyses of the red chalk of Candlesby and Langton and of the red marly chalk of Speeton, and descriptions by W. Hill and J. J. H. Teall of the mineral constitution of the Red Chalk]. Mem. Geol. Survey, 1900, pp. xiv. + 499. Reviewed in Nature, 25th Oct. 1900, pp. 617-8.

B. A. BURRELL.

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The Composition of some Malham Waters [Details of the chemical constituents of the waters in the district]. Proc. Yorks. Geol. and Polyt. Soc., Vol. 14, Part 1, 1900, pp. 45-48.

F. M. BURTON.

LINC. N.

Large Fairy Rings at Fillingham Castle [Brief notes on the geological nature of the subsoils]. Naturalist, Dec. 1900, p. 367.

F. M. BURTON. LINC. N.
Lincolnshire Coast Boulders [criticises Mr. Harker's notes in a previous issue]. *Naturalist*, March 1900, pp. 93-96; April, p. 97.

F. M. BURTON. NOTTINGHAMSHIRE.
Gravel beds on which the Stapleford Woods are situated [as noted on the excursion of the Linc. Nat. Union to Newark, 29th June 1899]. *Naturalist*, April 1900, p. 120-121.

W. J. P. BURTON. DERBYSHIRE.
The Lead Ore Deposits of Derbyshire [gives historical notes and describes the mode of occurrence of the ore]. *Derbyshire Naturalists' Quarterly*, Vol. 1, No. 3, Oct. 1900, pp. 45-49.

W. J. P. BURTON [not signed]. DERBYSHIRE.
The Gritstone of Derbyshire [describes the Grit, its contained fossils, etc.]. *Derbyshire Naturalists' Quarterly*, Vol. 1, No. 1, May 1900, pp. 2-5.

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On White Sandstone Nodules found in No. 1 Pit, Lord Derby's Siding, Rainford. *Trans. Manch. Geol. Soc.*, Vol. 26, 1900, pp. 591-592.

C. S. CARTER. LINC. N.
Neolithic Implements near Louth [records arrow heads, scrapers, etc., presumably of flint]. *Naturalist*, Oct. 1900, p. 291.

C. S. CARTER. LINC. N.
Red Chalk Fossils at Redhill, near Goulceby, Lincs. N. [gives five or six additions to the list in the Geological Survey Memoir]. *Naturalist*, Oct. 1900, p. 291.

W. LOWER CARTER [not signed]. YORKSHIRE.
Secretary's Report, 1899 [refers to the work accomplished on the excursions, etc.]. *Proc. Yorks. Geol. and Polyt. Soc.*, 1900, Vol. 14, Part 1, pp. 99-124.

W. L. CARTER. See 'P. F. Kendall.'

EDWARD MAULE COLE. YORKS. N.E. AND S.E.
Moraine near Filey [points out a good position for viewing 'the great moraine which dammed back the waters of the Rye']. *Naturalist*, March 1900, p. 68.

H. H. CORBETT. YORKS. S.W.
One dolerite [boulder at] Cusworth [In the Yorkshire Boulder Committee and its Fourteenth Year's Work]. *Naturalist*, Dec. 1900, p. 361.

M. COSSMANN. YORKSHIRE, ETC.
[Review of a paper] 'On the occurrence in British Carboniferous Rocks of the Devonian Genus Palæoneils, with the description of the new species *P. carbonifera*, by Dr. W. Hind, in *Quart. Journ. Geol. Soc.*, 1900. *Revue Critique de Paléozoologie*, Oct. 1900, p. 152.

M. COSSMANN. YORKSHIRE, ETC.
[Review of] 'A Monograph of the British Carboniferous Lamelli-branchiata, Part 4,' by W. Hind. *Revue Critique de Pal.*, Oct. 1900, pp. 155-156.

T. A. COWARD AND CHARLES OLDHAM. CHESHIRE.
The Birds of Cheshire . . . and a map of the county . . . Manchester . . . 1900 | viii. + 278 [brief geological notes]. See Review in the *Naturalist*, Sep. 1900, pp. 285-287.

Naturalist.

W. H. CROFTS. YORK S.E.

A specimen of Post-Archæ[a]n granite from Angermanland or Aland [at Easington; in the Report of the East Riding Boulder Committee, 1898]. *Trans. Hull Geol. Soc.*, Vol. 5, Part 1, 1898-99 (publ. 1900), p. 5.

W. H. CROFTS. YORK S.E.

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W. H. CROFTS. YORK S.E.

The Upper Flintless Chalk at Beverley [apparently 170 feet thick, as flint was met with in a boring at 176 feet]. *Trans. Hull Geol. Soc.*, Vol. 5, Part 1, 1898-99 (publ. 1900), p. 27.

W. B. CRUMP [not signed].

[The Flora of Halifax.] Introduction. Chapter 1. The Parish of Halifax. [Geological notes.] *Halifax Naturalist*, June 1900, pp. ix.-xvi.

S. W. CUTTRISS. YORK MID W.

"Cave-Hunting in Yorkshire" [summary of lecture delivered to the Halifax Scientific Society]. *Halifax Naturalist*, April 1900, p. 18.

J. R. DAKYNS. YORK MID W., LAKE DISTRICT.

Modern Denudation in North Wales [also cites instances in Craven, Cumberland, Westmorland, etc.]. *Geol. Mag.*, Jan. 1900, pp. 18-20.

ELIZABETH DALE. DERBYSHIRE.

The Scenery and Geology of the Peak of Derbyshire [a general account with special reference to particular sections, fossil localities, etc., and discussion of the origin of the scenery], pp. viii. + 176, with figures and a map, Buxton and London. Reviewed in *Nature*, 22nd Nov. 1900, p. 80.

W. M. DAVIS. LAKE DISTRICT.

Glacial Erosion in France, Switzerland, and Norway [referring to examples of 'over-deepened main valleys and hanging lateral valleys' in the English Lake District]. *Proc. Boston Soc. Nat. Hist.*, Vol. 29, July 1900; reviewed in *Geol. Mag.*, Dec. 1900, pp. 575-576.

CHARLES DAVISON. LINCOLNSHIRE, LANC. S.

On Some Minor British Earthquakes of the Years 1893-1899 [the Rutland earthquake of 28th January 1898 was felt in Lincolnshire, and an 'earth-shake' occurred at Pendleton, near Manchester, on 27th February 1899]. *Geol. Mag.*, April 1900, pp. 164-177.

R. M. DEELEY. DERBYSHIRE.

Fine Section of Boulder-clay at Crich [Large exposure of boulder-clay resting upon a striated floor of Mountain Limestone recently exposed]. *Geol. Mag.*, Oct. 1900, pp. 476-477.

C. E. DERANCE. LANCASHIRE.

The Salford Earthquake. *Trans. Manch. Geol. Soc.*, Vol. 26, 1900, pp. 495-496.

E. DICKSON. LANC. S.

Notes on Glacial and Post-Glacial Deposits near Southport [describes an area of about 35 square miles on the southern side of the Ribble estuary, which is principally occupied by the site of a post-glacial mere, details of which are given]. *Proc. Liverp. Geol. Soc.*, Vol. 8, Part 4, 1899-1900 (publ. 1900), pp. 454-462.

WILLIAM MORLEY EGGLESTONE. DURHAM.

Glacier Footprints in the Wear Valley [describes striated surface at Jack's Crag, near Stanhope]. *Trans. Weardale Nat. Field Club*, Vol. 1, No. 1, 1900, pp. 78-16.

W. M. EGGLESTONE.

DURHAM.

Pectolite—a Mineral new to Durham [found in a basalt quarry at Burtreeford, near Cowshill, Weardale]. Trans. Weardale Nat. Field Club., Vol. 1, No. 1, 1900, pp. 125-126.

W. M. EGGLESTONE.

DURHAM.

Crystals within Crystals [small cubes of galena embedded in quartz crystals from Old Faw Mine]. Trans. Weardale Nat. Field Club., Vol. 1, No. 1, 1900, pp. 122-123.

J. V. ELSDEN.

YORK MID W. AND S.W.

[The Coalfields of] Yorkshire. Coll. Guard., Vol. 79, 1900, pp. 112-120, 145-157, 197-207, 245-259, 309-322; maps.

C. W. FENNELL AND J. A. BEAN.

YORK MID W.

[The Underground Waters of North-west Yorkshire. Part I. The Sources of the River Aire.] II. Engineering Report [gives details of the gaugings of water at Malham Tarn, Malham Cove and Aire Head]. Proc. Yorks. Geol. and Polyt. Soc., Vol. 14, Part 1, 1900, p. 11-13.

C. LE NEVE FOSTER.

NORTHERN COUNTIES.

Output and Value of the Minerals raised in the United Kingdom in 1899. Summarised in Nature, 15th Nov. 1900, pp. 72-73.

YORKSHIRE, LANCASHIRE, CHESHIRE, DERBYSHIRE,

E. J. GARWOOD [Secretary].

ISLE OF MAN.

Life-Zones in the British Carboniferous Rocks.—Report of the Committee [includes (i.) Report on Carboniferous Rocks and Fossils, South Pennine District, by Dr. Wheelton Hind; (ii.) Report on Carboniferous Rocks and Fossils, North Wales District; (iii.) Report on Carboniferous Rocks and Fossils, Isle of Man]. Rep. Brit. Assn., 1899 (publ. 1900), Dover Meeting, pp. 371-375.

R. A. GATTY.

LANC. S., YORK S.W.

Pigmy Flint Implements [found in large quantities in East Lancashire and South Yorkshire in association with other worked flints of Neolithic age. The Reliquary and Illustrated Archæologist, Vol. 6, 1900, pp. 15 et seq.; summary in Nature, 18th Jan. 1900, p. 282.

ARCH. GEIKIE.

DERBYSHIRE, CHESHIRE, ETC.

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J. G. GOODCHILD.

CUMBERLAND.

Formation of Maritime Peat [citing an occurrence at Maryport, and arguing that such cases do not necessarily imply changes of level]. Geol. Mag., Aug. 1900, p. 381.

MARIA M. GORDON.

ISLE OF MAN.

Similar Geological Structures in South Tyrol and the Isle of Man [calling attention to the resemblance as regards mechanical disturbance between the two districts as described by the writer and G. W. Lamplugh respectively]. Nature, 22nd March, 1900, Vol. 61, p. 490.

MARIA M. OGILVIE GORDON.

ISLE OF MAN.

Rock-Structures in the Isle of Man and in South Tyrol [remarks on G. W. Lamplugh's recent paper and points out the parallelism in the general sequence of geological events in the Isle of Man and in South Tyrol]. Nature, 3rd May 1900, p. 7.

J. GOWAN. See 'A. C. SEWARD.'

A. GREENWELL.

YORKSHIRE.

Some Yorkshire Clay Pits. Quarry, Vol. 5, 1900, pp. 515-524.

Naturalist,

W. S. GRESLEY.

DERBYSHIRE.

Coal Plants. Incontrovertible Evidence of Growth *in situ*. [Brings evidence forward from observations made in the South Derbyshire Coal-field, etc.] *Geol. Mag.*, Dec. 1900, pp. 538-542.

W. GUNN.

CHEVIOTLAND.

The Geology of Belford, Holy Island, and the Farne Islands, Northumberland (Explanation of Quarter-Sheet 110 S.E., New Series, Sheet 4). [Describes in detail the Carboniferous strata of the district with the Whin Sill and basic dykes; the Glacial, Post-Glacial, and Recent Deposits; with remarks on the Economic Geology; and (as appendices) Lists of Fossils, Vertical Sections, Glossary of Local and Mining Terms, and Bibliography.] *Mem. Geol. Surv. Engl. and Wales*; 8vo., pp. iv. + 155; London, 1900. Reviewed in *Geol. Mag.*, May 1900, p. 234.

EDMOND HARFIELD.

YORK S.E.

The Way of a Waterspout [describing the violent one which struck Langtoft (date not given, but presumably that of 3rd July 1892); an account illustrated by reproductions of photographs]. *Pearson's Magazine*, Nov. 1900, Vol. 10, pp. 531-535.

E. G. J. HARTLEY.

CUMBERLAND.

On the Constitution of the Natural Arsenates and Phosphates. Part III.—Plumbogummite and Hitchcockite [The mineral from Roughten Gill, formerly believed to be a zinc silicate and since referred by Miers to plumboserrinitite, has been analysed and found to be identical with the hitchcockite from Georgia]. *Min. Mag.*, July, Vol. 12, pp. 223-233.

JOHN HAWELL.

YORK N.E.

A Peat Deposit at Stokesley [describes a bed of peat occurring at a depth of seven feet]. *Proc. Yorks. Geol. and Polyt. Soc.*, Vol. 14, Part 1, 1900, pp. 49-51.

E. HAWKESWORTH.

YORK N.E.

Mammoth's Tooth at Staithes [found on the beach]. *Naturalist*, Dec. 1900, p. 360.

WHEELTON HIND.

CHEVIOTLAND, YORK MID W. AND S.W., CHESHIRE,
DERBYSHIRE, ISLE OF MAN.

A Monograph of the British Carboniferous Llamellibranchiata. Part V., pp. 361-476, Pl. XL.-LIV. [including the genera *Sanguinolites*, *Solenopsis*, *Allorisma*, *Tellinomorpha*, *Solenomya*, *Conocardium*, and *Chænocardia*. The new species are *Sanguinolites hibecnicus* from Castleton, *S. V.-scripta* from Congleton Edge and Redesdale, *S. interruptus* from Thorpe Cloud, Dovedale, and Castleton, *S. striato-granulatus* from Eskerhouse and Hill Stebden, *S. oblongus* from Park Hill, Castleton, and Bolland, *S. striatus* from Redesdale, *S. ovalis* from Holt Head, near Saddleworth, *Solenopsis parallela* from Lowick, and *Allorisma monensis* from Scarlett Point and Balasala (Isle of Man)]. *Palæontogr. Soc.*, Vol. 54, 1900; see Review by M. Cossmann in *Revue Critique de Palæozoologie*, Oct. 1900, pp. 155-156.

WHEELTON HIND.

YORKSHIRE, LANCASHIRE, ETC.

Report on Carboniferous Rocks and Fossils, South Pennine District. [In 'Life-zones in the British Carboniferous Rocks—Report of Committee.']. *Rep. Brit. Assn.*, 1899, publ. 1900, Dover Meeting, pp. 371-375.

WHEELTON HIND.

CHESHIRE.

On a Series of Agglomerates, Ashes, and Tuffs occurring in the Carboniferous Limestone Series of Congleton Edge. *Trans. N. Staff. Field Club*, Vol. 34, 1900, pp. 80-86.

WHEELTON HIND.

YORK MID W.

On the Occurrence in British Carboniferous Rocks of the Devonian

Genus *Palæoneilo*, with a description of the New Species *P. carbonifera* [The new species described and figured is from the shales above the main mass of limestone in the beck, south of Hammerton Hall, Slaiburn, Yorkshire]. Quart. Journ. Geol. Soc., Vol. 56, Feb. 1900, pp. 46-49; see Review by M. Cossmann in Revue Critique de Paléozoologie, Oct. 1900, p. 152.

G. J. H[INDE].

WESTMORLAND.

A Memoir of the Palæozoic Reticulate Sponges constituting the

Family Dictyospongidae. By James Hall. [Reviewed; points out that apparently the oldest representative of this family has been found in the micaceous shales of the Upper Ludlow of Westmorland, and has been described by McCoy under the name of *Tetragonis danbyi*]. Geol. Mag., May 1900, pp. 230-232.

BENJ. HOLGATE.

YORK S.W. AND MID W.

Description of Coals of Bradford, Halifax, and Leeds [exhibited

at the Bradford Meeting of the British Association]. 12 pp. pamphlet, 1900.

PHILIP HOLLAND. See 'T. Mellard Reade.'

W. F. HOLROYD. See 'J. Barnes.'

J. H. HOWARTH.

YORK MID W.

The Underground Waters of North-west Yorkshire. Part I.

The Sources of the River Aire. I. Introduction [Refers to previous investigations and summarises what is known of the problem]. Proc. Yorks. Geol. and Polyt. Soc., Vol. 14, Part 1, 1900, pp. 1-11.

J. H. HOWARTH.

YORKSHIRE.

Some Yorkshire Erratics and How to Recognise Them [abstract

of Lecture]. Trans. Leeds Geol. Assn., Vol. 12, 1900, p. 14.

J. H. HOWARTH. See 'P. F. Kendall.'

J. A. JORDAN.

LINC. N.

[Boulder of Shap Granite at] Gainsborough [in The Yorkshire

Boulder Committee and its Fourteenth Year's Work]. Naturalist, Dec. 1900, p. 362. (See also Naturalist, 1902, p. 128.)

PERCY F. KENDALL.

LAKE DISTRICT, ETC., YORKSHIRE.

The Geological Conditions of Underground Water Supply [gives

many interesting details of interest to North of England geologists]. Trans. Hull Geol. Soc., Vol. 5, Part 1, 1898-99 (publ. 1900), pp. 13-18.

P. F. KENDALL.

YORKSHIRE.

The Glacial Lakes and River Channels of Yorkshire [abstract of

Lecture]. Trans. Leeds Geol. Assn., Vol. 12, 1900, pp. 27-28.

PERCY F. KENDALL.

YORKSHIRE.

On the Glacial Drainage of Yorkshire [describes the effect

produced when the edge of a glacier or ice-sheet obstructed the rivers of the adjacent country, ponding up the water to produce a lake, the overflow of which was carried into some adjacent valley as a river]. Rep. Brit. Assn. 1899, publ. 1900, Dover Meeting, pp. 743-744.

PERCY F. KENDALL.

YORK MID W.

[The Underground Waters of North-west Yorkshire. Part I.

The Sources of the River Aire.] Appendix. Malham Tarn Flushes and Malham Cove [points out the effect of horizontal and vertical fissures upon the water on its journey from Malham Tarn to Malham Cove]. Proc. Yorks. Geol. and Polyt. Soc., Vol. 14, Part 1, 1900, pp. 38-44.

Naturalist,

- P. F. KENDALL. YORK N.E.
[Boulders at] Barugh Hill, near Robin Hood's Bay [etc., in The Yorkshire Boulder Committee and its Fourteenth Year's Work]. Naturalist, Dec. 1900, pp. 361-362.
- P. F. KENDALL [Secretary]. YORKSHIRE, CHESHIRE.
Erratic Blocks of the British Isles. Report of the Committee [With one exception all the records in this report are made by members of the Yorkshire Boulder Committee.] Rep. Brit. Assn., 1899 publ. 1900, Dover Meeting, pp. 398-402.
- PERCY F. KENDALL AND J. H. HOWARTH. YORK N.E. AND S.E.
The Yorkshire Boulder Committee and its Thirteenth Year's Work, 1898-9 [contains numerous valuable records, principally in the East of Yorkshire]. Naturalist, Dec. 1900, pp. 355-360.
- PERCY F. KENDALL AND J. H. HOWARTH. YORK S.W. AND N.E., LINC. N.
The Yorkshire Boulder Committee and its Fourteenth Year's Work, 1899-1900. Naturalist, Dec. 1900, pp. 361-364.
- PERCY F. KENDALL, J. H. HOWARTH, AND W. LOWER CARTER. YORK MID W.
[The Underground Waters of North-west Yorkshire. Part I. The Sources of the River Aire.] IV. Report of the Geological Sub-Committee [describes the rocks exposed in the area, and the geological results of the investigations]. Proc. Yorks. Geol. and Polyt. Soc., Vol. 14, Part 1, 1900, pp. 22-38.
- P. F. KENDALL AND H. B. MUFF. YORK N.E.
[Boulders at] Goathland, near Scarr Wood; Moss Dyke, Goathland, [etc., in The Yorkshire Boulder Committee and its Thirteenth Year's Work]. Naturalist, Dec. 1900, pp. 357-360.
- W. B. KENDALL. FURNESS.
Glacial Deposits in Furness and District [a paper read in December 1879, dealing with drift beds and boulders]. Furness Lore: being the Trans. Barrow Nat. Field Club for three years ending March 1882, printed and published in 1900, pp. 25-30.
- W. B. KENDALL. FURNESS.
Submerged Peat Mosses, Forest Remains, and Post-Glacial Deposits in Barrow Harbour [read November 1880]. Furness Lore: being Trans. Barrow Nat. Field Club, three years ending March 1882, printed 1900, pp. 55-62 and plates.
- P. M. C. KERMODE [Secretary]. ISLE OF MAN.
Irish Elk Remains. Report of Committee [reports further investigations; list of plants, etc., given]. Rep. Brit. Assn., 1899, publ. 1900, Dover Meeting, p. 376.
- R. K[IDSTON]. LANC. S., YORKSHIRE.
Studies in Fossil Botany. By Dukinfield Henry Scott [Reviewed]. Geol. Mag., Dec. 1900, pp. 567-571.
- PHILIP LAKE. LAKE DISTRICT.
Bala Lake and the River System of North Wales [briefly compares with the river systems of the Lake District]. Geol. Mag., May 1900, pp. 204-215.
- G. W. LAMPLUGH. LINC. N., YORK S.E.
Note on the Age of the English Wealden Series [refers to the Lower Cretaceous beds at Speeton and in North Lincolnshire]. Geol. Mag., Oct. 1900, pp. 443-445.

- G. W. LAMPLUGH. ISLE OF MAN.
Report on Carboniferous Rocks and Fossils; Isle of Man District
 [In 'Life-zones in the British Carboniferous Rocks; Report of Committee']. Rep. Brit. Assn., 1899, publ. 1900, Dover Meeting, p. 375.
- G. W. LAMPLUGH. ISLE OF MAN.
On Some Effects of Earth-movement on the Carboniferous
 Volcanic Rocks of the Isle of Man [Makes an examination of the coast sections in the Carboniferous Volcanic Series between Castleton Bay and Poolvash, with the result that he has discovered evidence that the strata have undergone much deformation in pre-Triassic times, and probably before the Upper Permian rocks of the island were deposited]. Quar. Journ. Geol. Soc., Vol. 56, Feb. 1900, p. 11-25; Abstract in Geol. Mag., Feb. 1900, p. 89; Nature, 18th Jan. 1900, pp. 285-286; Sci. Goss., Feb. 1900, p. 287; see Quarry, Vol. 5, 1900, p. 324.
- HERBERT LAPWORTH. LAKE DISTRICT.
The Silurian Sequence of Rhayader [compares the graptolite fauna of Rhayader with that of the Lake District, etc.]. Quart. Journ. Geol. Soc., Feb. 1900, Vol. 56, pp. 67-137.
- ROBERT LAW. See 'W. Simpson.'
- H. LOUIS. DERBYSHIRE, NOTTINGHAMSHIRE.
Dolomite [Abstract of Lecture; gives chemical analyses, etc., of specimens from Derbyshire and Nottinghamshire] Trans. Burton-on-Trent Nat. Hist. and Arch. Soc., Vol. 4, Part 2, 1897-99, publ. 1900, pp. 111-116.
- E. LOZÉ. NORTH OF ENGLAND.
Les Charbons Britanniques et leur épuisement [including a general geographical and geological account of the British Isles, a detailed description of the several coalfields, and an estimate of the existing supplies of coal in the country and their probable duration]. Two vols., 8vo., pp. ix. + 559 and vii. + 668; Paris. Review in Nature, 7th June 1900, pp. 124-125.
- JOHN LUBBOCK. See 'Lord Avebury.'
- R. TAYLOR MANSON. DURHAM.
Outlines of the Geology of South Durham [reprinted from the Darlington Half-holiday Guide; gives a general account of the geological formations, and is illustrated by various geological sections], 1900. See Naturalist, May 1900, p. 140.
- J. E. MARR. CUMBERLAND.
Notes on the Geology of the English Lake District [prepared for the summer excursion of the Geologists' Association]. Proc. Geol. Assn., Aug. 1900, pp. 449-483.
- J. E. MARR. LAKE DISTRICT.
Long Excursion to Keswick [with supplementary excursions to Causeway Foot, Eycott Hill, and Threlkeld Mine, under the leadership of John Postlethwaite]. Proc. Geol. Assn., Vol. 16, 1900, pp. 526-532; map.
- JOHN E. MARR. LAKE DISTRICT, ETC.
The Scientific Study of Scenery [with numerous references to the Lake District, West Yorkshire, etc.]. 1900. 8vo., pp. ix. + 368; London.
- EDWARD A. MARTIN. YORK S.E.
A History of Chalk [briefly refers to the Speeton Clay of East Yorkshire and its zonal divisions]. Science Gossip, Jan. 1900, p. 235.

EDWARD A. MARTIN.

YORK S.E.

Water-line in Chalk [refers to a paper read to the Hull Naturalists' Club by J. R. Mortimer in which it is stated that the water-line in the chalk of Yorkshire in no place exceeds 300 feet, and is not a horizontal plane, but rises northwards and westwards]. *Sci. Gossip*, April 1900, p. 350.

J. McDONALD.

CHESHIRE.

A Carboniferous Crustacean [records the discovery of a specimen of *Necroscilla wilsoni* H. Woodward in the Middle Coal Measures at Poynton, Cheshire]. *Sci. Goss.*, Oct. 1900, p. 157.

A. T. METCALFE.

DERBYSHIRE.

The River Scenery of Derbyshire [explaining the part played by the Geological Structure of the county]. *Derbyshire Naturalists' Quarterly*, Vol. 1, No. 2, July 1900, pp. 21-25.

H. A. MIERS.

CUMBERLAND.

Note on the Hitchcockite, Plumbogummite, and Beudantite analysed by Mr. Hartley [identifying the Roughten Gill mineral as a pseudomorph of hitchcockite after pyromorphite]. *Min. Mag.*, July 1900, Vol. 12, pp. 239-243.

J. MONCKMAN.

YORK MID W. AND S.W.

Short Geological Excursions. [Bradford.] Handbook British Association Excursions, 1900, pp. 1-6.

J. P. MORRIS.

LAKE DISTRICT.

The Geology of the Lake District [on general lines: a paper read in March 1884]. *Furness Lore*: being *Trans. Barrow Nat. Field Club*, three years ending March 1882, printed 1900, pp. 124-127.

J. R. MORTIMER.

YORK S.E.

Notes on the History of Driffield Museum of Antiquities and Geological Specimens [describes the conditions under which the Driffield Museum collections were obtained]. *Proc. Yorks. Geol. and Polyt. Soc.*, Vol. 14, Part 1, 1900, pp. 88-96, and *Trans. Hull Sci. and Field Nat. Club*, Vol. 1, Part 3, 1900, pp. 135-141.

HERBERT B. MUFF.

YORK N.E.

Mammoth's Tooth at Robin Hood's Bay [found on the beach; presumably derived from the Boulder Clay]. *Naturalist*, Oct. 1900, p. 291.

H. B. MUFF. See 'P. F. Kendall.'

R. D. OLDHAM.

CUMBERLAND.

Beach Formation in the Thirlmere Reservoir [observed since Thirlmere was used for the Manchester water supply]. *Geol. Mag.*, Oct. 1900, p. 473.

R. D. OLDHAM.

LAKE DISTRICT.

The Basal (Carboniferous) Conglomerate of Ullswater and its Mode of Origin [concluding that the conglomerate is a torrential deposit, formed on dry land near the foot of a range of hills, in a generally dry climate]. *Geol. Mag.*, Dec. 1900, p. 564.

CHARLES OLDHAM. See 'T. A. Coward.'

C. O'SULLIVAN.

DERBYSHIRE.

The Dales of Derbyshire [including geological notes]. *Trans. Burton-on-Trent Nat. Hist. and Arch. Soc.*, Vol. 4, Part 2, 1897-99, publ. 1900, pp. 49-64.

- W. S. PARRISH. LINC. N.
The Goosehole Section at Frodingham, Lincolnshire [showing sand, peat, gravel, and Lias Limestone, probably one of the finest sections of its kind in the country; photo. as frontispiece to the volume]. Trans. Hull. Geol. Soc., Vol. 5, Part 1, 1898-99, publ. 1900, pp. 26-27.
- W. S. PARRISH. YORK S.E.
The [Hull Geological Society's] Photographic Committee's Report [enumerates list of local geological photographs, sent to the Yorkshire and British Association Geological Photographs' Committees]. Trans. Hull Geol. Soc., Vol. 5, Part 1, 1898-99, p. 6.
- EDWARD ADRIAN WOODRUFFE PEACOCK. LINC. N. AND S.
Lincolnshire Naturalists at Frieston [geological notes]. Naturalist, May 1900, pp. 141-144.
- EDWARD ADRIAN WOODRUFFE PEACOCK. LINC. N.
Lincolnshire Naturalists at Linwood Warren [geological notes]; gives list of thirteen species of fossils from the Kimeridge Clay at Market Rasen, collected by Mr. W. Lewington]. Naturalist, Sept. 1900, pp. 273-276.
- EDWARD ADRIAN WOODRUFFE PEACOCK. LINC. N.
Lincolnshire Naturalists at Saltfleetby [on 8th June 1899; geology briefly referred to]. Naturalist, March 1900, pp. 75-79.
- MAX PEACOCK. LINC. N.
Kimeridge Clay Fossils: Market Rasen [list of seven species given]. Naturalist, Dec. 1900, p. 360.
- H. PRESTON. LINC. N. AND S.
Naturalists at Lincoln [geological notes; points out that there is no evidence in favour of the 'Marlstone Rock' bed occurring at Lincoln]. Naturalist, Aug. 1900, pp. 248-251.
- HENRY PRESTON. LINC. N.
The Stone Curtain at Roxby [figures and describes a mass of calcareous tufa deposited from a petrifying spring, in Roxby-cum-Kisby, North Lincolnshire]. Sci. Goss., Dec. 1900, pp. 193-194.
- H. PRESTON. NOTTINGHAMSHIRE.
Keuper Marl [address on the; on the Excursion of the Lincolnshire Naturalists' Union to Newark on 29th June 1899]. Naturalist, April 1900, pp. 117-119.
- G. T. PRIOR. CUMBERLAND.
Hamlinite, Florencite, Plumbogummite (Hitchcockite), Beudantite, and Svanbergite, as members of a natural group of minerals [discussing the true nature and formula of the Roughten Gill hitchcockite]. Min. Mag., July 1900, Vol. 12, pp. 249-254.
- T. MELLARD READE. CHESHIRE, LANC. S.
A Contribution to Post-Glacial Geology. Foraminifera of the Formby and Leasowe Marine Beds [describes several species of foraminifera from these deposits, twenty-four of which are figured on Plate V.]. Geol. Mag., March 1900, pp. 97-105.
- T. MELLARD READE AND PHILIP HOLLAND. CUMBERLAND.
The Phyllades of the Ardennes compared with the slates of North Wales. Part II. [An analysis of a green slate from Buttermere, Lake District, added for comparison]. Proc. Liverp. Geol. Soc., Vol. 8, Part 4, 1899-1900, publ. 1900, pp. 463-478.
- F. R. COWPER REED. ISLE OF MAN.
Woodwardian Museum Notes: A New Carboniferous Cephalopod, *Pleuromutilus? scarlettensis*, sp. nov. [collected by Prof. Hughes' party]. Naturalist,

in 1892 at Scarlett Quarry (Carboniferous Limestone), Isle of Man].
Geol. Mag., March 1900, pp. 105-106, Plate VI.

J. F. ROBINSON.

YORK S.E.

[Boulder of basalt at] Wassand [in the Report of the East Riding
Boulder Committee, 1898]. Trans. Hull Geol. Soc., Vol. 5, Part 1, 1898-99,
publ. 1900, p. 5.

W. D. ROEBUCK [Editor, not signed].

YORKSHIRE.

Transactions of the Yorkshire Naturalists' Union, Part 26.
Issued to the members for the year 1900. [Contains reprints of the
circulars issued for excursions during 1897-1900, which include numerous
geological notes.] 1900.

FRANK RUTLEY.

WESTMORLAND.

Additional Notes on some Eruptive Rocks from New Zealand
[citing for comparison an Ordovician rhyolite from the northern end of
Dufton Pike, which Mr. P. Holland finds to contain 69 per cent. of silica].
Quart. Journ. Geol. Soc., Aug. 1900, Vol. 56, pp. 493-510.

HAROLD SALES.

YORK S.E.

[Boulders at] Willerby, near Hull [from Boulder Clay resting on
Chalk; local and foreign rocks noted]. Trans. Hull Geol. Soc., Vol. 5,
Part 1, 1898-99, publ. 1900, p. 5.

M. E. SAUVAGE.

LANC. S., YORK S.W.

[Reviewing a paper on] "The Fish Fauna of the Lower Coal
Measures of the Halifax and Littleborough Districts," by E. D. Welburn,
in Proc. Yorks. Geol. and P. Soc., 1898; Revue Critique de Paléozoologie,
Paris, Jan. 1900, pp. 2-3.

M. E. SAUVAGE.

YORK N.E.

[Reviewing a paper] "On the Fossil Fish of the Upper Lias of
Whitby," by A. Smith Woodward, in Proc. Yorks. Geol. and Polyt. Soc.,
1898; Revue Critique de Pal., July 1900, pp. 110-111.

M. E. SAUVAGE.

YORK S.W.

[Reviewing a paper] "On a New Species of Lepracanthus from the
Yorkshire Coal Measures," by E. D. Wellburn, in Geol. Mag., 1899;
Revue Critique de Pal., July 1900, p. 115.

D. H. SCOTT.

LANC. S.

Notes on the Occurrence of a Seed-like Fructification in certain
Palæozoic Lycopods [from the Lower Coal Measures of Hough Hill,
Stalybridge, and of Moorside, Oldham; a fruit resembling a Lepi-
dostrobus, here named *Lepidocarpon lomaxi*]. Proc. Royal Soc., Vol. 67,
1900, p. 306; summary in Nature, 29th Nov. 1900, pp. 121-122.

DUKINFIELD HENRY SCOTT.

YORK S.W., LANC. S.

Studies in Fossil Botany [containing thirteen chapters devoted to
the microscopical structure, morphology, and affinities of Carboniferous
plants, and one on the Mesozoic Gymnosperms; a large proportion of the
material described is from the Yorkshire and Lancashire Coalfields],
pp. xiii. + 533, London, 1900. Reviewed in Geol. Mag., Dec. 1900, pp.
567-571, and Nature, 15th Nov. 1900, pp. 53-54.

A. C. SEWARD.

YORK S.E.

The Jurassic Flora of Britain [brief Abstract of Address on East
Yorkshire Fossil Plants]. Rep. Brit. Assn., 1899, publ. 1900; Dover
Meeting, p. 926.

A. C. SEWARD.

YORK S.E.

Catalogue of the Mesozoic Plants in the Department of Geology
[British Museum] (Natural History). The Jurassic Flora. I. The York-
shire Coast. [Plates i.-xxi.] by A. C. Seward, M.A., F.R.S., F.G.S.,

[. . . London . . . 1900. [A valuable volume, profusely illustrated with beautiful plates and process blocks; principally describes specimens from the Scarborough and Gristhorpe Beds, collected by the late Mr. W. Bean], pp. xii. + 341.

A. C. SEWARD.

YORK N.E.

Notes on some Jurassic Plants in the Manchester Museum [some of the plant remains collected by the late Prof. Williamson, near Scarborough, now in the Manchester Museum, have been carefully examined by the author, with the result that he finds many of them identical with fossil plants described previously under other names by Brongniart, whilst others figured by Lindley and Hutton under one name are shown to be identical with other plant-remains which have been differently identified]. *Mem. and Proc. Manch. Lit. and Phil. Soc.*, Vol. 44, Part 3, 1900, 27 pp. and 4 plates; Abstract in *Nature*, 8th Feb. 1900, pp. 358-359; reprinted in 'Notes from the Manchester Museum,' No. 6, 1900.

A. C. S[EWARD].

YORK N.E.

The Norwegian North Polar Expedition, 1893-96: Scientific Results [etc., review of; compares the numerous examples of small *Ginkgo* leaves, collected on this expedition, with the larger-leaved *Ginkgo digitata* of the Inferior Oolitic rocks of North-East Yorkshire, suggests that 'it is not improbable that in the fragmentary fossils from Cape Flora we have the remains of a flora but slightly younger than that which has left abundant traces in the Lower Oolite strata of more southern latitudes']. *Nature*, Vol. 62, 14th June 1900, pp. 146-148.

A. C. S[EWARD].

LANC. S., ETC.

Botany at the British Association [a review of the botanical work accomplished at the Bradford Meeting of the Association; including references to Coal Measure plants from the South Lancashire coalfields, etc.]. *Nature*, 18th Oct. 1900, pp. 610-614.

A. C. SEWARD and J. GOWAN.

YORK N.E.

The Maidenhair Tree (*Ginkgo biloba*, L.) [refers to the Inferior Oolite beds of the Yorkshire coast, where a Jurassic representative of the Maidenhair tree occurs (*Ginkgo digitata*)]. *Annals of Botany*, Vol. 14, No. 53, March 1900, pp. 109-154, plates 8-10.

THOMAS SHEPPARD.

YORK S.E.

Notes on some Remains of *Cryptocleidus* from the Kellaways Rock of East Yorkshire [found in a sand pit on Mill Hill, near Brough; hitherto remains of *Cryptocleidus* were only recorded from the Oxford Clay]. *Geol. Mag.*, Dec. 1900, pp. 535-538.

THOMAS SHEPPARD.

CUMBERLAND.

Striæ as Evidence of Ice Action [criticises Dr. P. Q. Keegan's note in a previous issue to the effect that striæ can be caused by 'inroads of the weather, lichens, etc.,' and suggests that the striæ on the rocks 'edging the valley where the Derwentwater reposes' are evidence of ice action]. *Science Gossip*, Feb. 1900, p. 277.

THOMAS SHEPPARD.

YORK S.E.

Saurian Remains in the Kellaways Rock, Brough, East Yorkshire [describes some remains of *Cryptocleidus* from the Kellaway Sands on Mill Hill; remains of which have not hitherto been found below the Oxford Clay]. *Trans. Hull Geol. Soc.*, Vol. 5, Part 1, 1898-99, publ. 1900, pp. 23-24.

T. SHEPPARD.

YORK S.E.

Tooth of *Oxyrhina macrorhiza* from the Red Chalk at Speeton [found by F. Lamplough; an addition to the Red Chalk fauna of England]. *Trans. Hull Sci. and Field Nat. Club*, Vol. 1, Part 3, 1900, p. 119.

THOMAS SHEPPARD.

YORK N.E.

[Boulder of Rhomb-porphry at] Yedmandale, near West Ayton
[In the Yorkshire Boulder Committee and its Thirteenth Year's Work].
Naturalist, Dec. 1900, p. 356.

THOMAS SHEPPARD.

YORK S.E.

[Boulders at] Atwick, Brough, Dimlington, Holmpton, Hornsea,
[and] Withernsea [In the Report of the East Riding Boulder Committee,
1898]. Trans. Hull Geol. Soc., Vol. V., Part 1, 1898-99 (publ. 1900), p. 5.

THOMAS SHEPPARD.

YORK S.E.

**Notes on a French Type of Bronze Axe found at Hull [at a depth of
40 feet; brief geological notes].** Antiquary, Aug. 1900, pp. 246-247.

THOMAS SHEPPARD.

LINC. N.

Note on a Roman Vase recently found in North Lincolnshire
[resting on peat under five feet of old Humber silt; geological structure
of neighbourhood briefly referred to]. Antiquary, April 1900, pp. 120-121.

THOMAS SHEPPARD.

YORK S.E.

**British Remains near Brough [brief report of paper describing
a British interment, with bronze dagger and bone pin, found at Brough].**
Hull Literary Club Magazine, Vol. 2, Part 1, 1900, p. 64.

THOMAS SHEPPARD.

YORK S.E.

**A [Descriptive Catalogue] of the Specimens in the Mortimer
Museum [of] Archæology and Geology, at Driffeld. [with illustrations.]**
By [Thomas Sheppard, F.G.S.] One Shilling net. London. . . .
[. . .] 1900. [Under the heads of Preface; Notes on the History of the
Museum; General Exhibits; Archæological Section; Geological Section;
Bibliography; and Index]. 82 pp.

THOMAS SHEPPARD.

YORK S.E.

**Prehistoric Man in Holderness [gives an account of the geological
structure of the district, and describes in detail the lake-dwellings, earth-
works, tumuli, and various relics of prehistoric date found in the neigh-
bourhood].** Antiquary, Feb. 1900, pp. 38-44, and March, pp. 80-87; and
Trans. Hull Sci. and Field Nat. Club, Vol. 1, Part 3, 1900, pp. 71-89
(plates); in Journal Assoc. Architect. Societies, 1900 (plates); Abstract in
Hull Literary Club Magazine, Vol. 2, Part 1, 1900, pp. 39-43.

THOMAS SHEPPARD.

YORK S.E., LINC. N.

**Local Archæological Notes. (a) Note on a Bronze Mould and a
Hoard of Bronze Axes found at Hotham Carrs, East Yorkshire. (b) On
a French Type of Bronze Axe found at Hull. (c) On a Roman Vase
recently found in North Lincolnshire [Including geological notes].**
Trans. Hull Sci. and Field Nat. Club, Vol. 1, Part 3, 1900, pp. 120-126
(plate).

THOMAS SHEPPARD.

NORTHERN COUNTIES.

**Bibliography: Papers and records published with respect to the
Natural History and Physical Features of the North of England. Geology
and Palæontology, 1896 [contains references to and summaries of 186
papers, etc.].** Naturalist, June 1900, pp. 173-191.

THOMAS SHEPPARD.

YORK S.E., LINC. N.

**Bibliography: List of papers referring to the Geology, etc., of the
the East of Yorkshire and North Lincolnshire, which have been published
during 1898 [gives titles, summaries, etc., of eighteen papers].** Trans.
Hull Geol. Soc., Vol. 5, Part 1, 1898-99, publ. 1900, pp. 27-28.

T. S[HEPPARD] AND J. W. S[TATHER]. YORK N.E. AND S.E., LINC. N.

**Field Meetings [of the Hull Geological Society] during 1898 [report
on the; describes visits to Filey, Muston, and Flixton (Glacial, Oolites,
and Chalk); East Halton and Killingholme (Glacial); South Cave (Oolites**

and Glacial); Doncaster and Balby (Trias and Glacial); Withernwick and Marton (Post Glacial); Malton and North Grimston (Oolites); Lincoln (Lias and recent); Holme-on-Spalding Moor (Trias and Glacial); Spurn and Easington; Speeton (Cretaceous and Glacial); Brough (Oolites); and Middleton-on-the-Wolds (Chalk). Trans. Hull Geol. Soc., Vol. 5, Part 1, 1898-99, publ. 1900, pp. 7-11.

J. SHIPMAN.

NOTTS.

[Address on local geology to the Linc. Nat. Union on their Excursion to Newark, 29th June 1899]. Naturalist, April 1900, p. 119-120.

WILLIAM SIMPSON.

YORK S.W.

Notes on a Section exposed in Commercial Street, Halifax [Section in Rough Sand-rock, the topmost bed of the Millstone Grits, showing effects of upthrusts]. Halifax Nat., Dec. 1900, pp. 100-102.

WILLIAM SIMPSON.

YORK, S.W.

Norland Clough: I.—Its Geology [describes the beds of the Millstone Grit, etc.]. Halifax Naturalist, June 1900, pp. 30-32.

WM. SIMPSON AND ROBERT LAW.

YORK S.W.

[Boulders at] Mytholmroyd [In the Yorkshire Boulder Committee and its Fourteenth Year's Work]. Naturalist, Dec. 1900, pp. 362-363.

W. J. SOLLAS.

YORKSHIRE, LANCs.

Fossils in the Oxford University Museum. II.—On two new genera and species of Crinoidea (*Brahmacrinus ponderosus* and *Cicero-crinus elegans*) [two specimens of the first-named species are from the Carboniferous Limestone of Yorkshire; there are some examples in the British Museum from Preston, Lanc.] Quart. Journ. Geol. Soc., Vol. 56, May 1900, pp. 264-272.

HARRY SPEIGHT.

YORK MID W.

Upper Wharfedale. being a complete account of the History, Antiquities, and Scenery By Harry Speight, illustrated [London . . . 1900 [contains notes on the geology and prehistoric archæology]. 518 pp.

J. W. STATHER.

YORK S.E.

A Buried Valley in the Chalk at Flambro' Station [the railway cuts this obliquely, and exposes beds of gravel, sand, etc., containing foreign boulders]. Trans. Hull Geol. Soc., Vol. 5, Part 1, 1898-99, publ. 1900, pp. 12-14.

J. W. STATHER.

YORK N.E., S.E.

[Boulders at] Ayton, East; Bainton-on-the-Wolds [etc., in The Yorkshire Boulder Committee and its Thirteenth Year's Work]. Naturalist, Dec. 1900, pp. 356-357.

J. W. STATHER.

YORK N.E., S.E.

[Abstract of paper on the relative proportions of different types of boulders on the East Coast; in the Yorkshire Boulder Committee and its Fourteenth Year's Work]. Naturalist, Dec. 1900, pp. 363-364.

J. W. STATHER [Secretary].

YORK N.E.

Report of the East Riding Boulder Committee, 1898 [and gives particulars of section and boulders at Scalby Mills, near Scarborough, and boulders of Shap granite at Burniston, near Scarborough]. Trans. Hull. Geol. Soc., Vol. 5, Part 1, 1898-99 (publ. 1900), pp. 5-6.

J. W. STATHER. See 'T. Sheppard.'

M. H. STILES.

YORK S.W.

Freshwater Sponges in Yorkshire [describes and figures the bi-rotulate spicules of *Spongilla fluviatilis* and the fuciform spicules of *S. lacustris*, from a sub-fossil deposit on the borders of Askern bog]. Naturalist, Nov. 1900, p. 331.

Naturalist.

MARK STIRRUP.

LANC. S.

The Earthquake of February 27th, 1899. Trans. Manch. Geol. Soc., Vol. 26, 1899, pp. 174-178.

A. H. STOKES.

DERBYSHIRE.

Castleton: Geology, Mineralogy, and Mining [an account of the Carboniferous rocks of the district, and of the galena, zinc-blende, barytes, fluor, and other minerals]. Trans. Inst. Min. Eng., Vol. 18, pp. 268-278; see also Proc. Midl. Inst. Min. Eng., Vol. 15, pp. 334-346.

W. H. THOMPSON.

YORK N.E.

The Pioneers of Yorkshire Geology [refers to William Smith, John Phillips, and W. C. Williamson, and their work on East Yorkshire geology]. Trans. Hull Geol. Soc., Vol. 5, Part 1, 1898-99 (publ. 1900), pp. 22-23.

ROBERT F. TOMES.

YORK N.E. AND S.E.

Contributions to a history of the Mesozoic Corals of the County of York [describes specimens from Malton, Whitby, Speeton, etc.]. Proc. York. Geol. and Polyt. Soc., Vol. 14, Part 1, 1900, pp. 72-85.

A. R. WALLACE.

YORK N.E.

Studies: Scientific and Social [boulder of rhomb-porphry figured, found by J. W. Stather]. See Proc. Y. G. and P. S., 1900, p. 103.

F. F. WALTON.

LINC. N. AND S.

The Lincoln Lias and its Fossils [gives list of seventy-four species collected from the Lincoln pits in 1899, and indicates the pits from which they have been taken]. Trans. Hull Geol. Soc., Vol. 5, Part 1, 1898-99 (publ. 1900), pp. 18-21.

F. F. WALTON.

YORK S.E.

[Boulders of Rhomb-porphry at] Brandesburton [etc., in The Yorkshire Boulder Committee and its Thirteenth Year's Work]. Naturalist, Dec. 1900, p. 356.

F. F. WALTON.

LINC. N. AND S.

The Marlstone at Lincoln [shows that in all probability Mr. J. H. Cooke is in error in his identification of the presence of the Marlstone in the Lias of Lincoln]. Naturalist, Sep. 1900, p. 288.

THOMAS WARD.

CHESHIRE.

The Subsidences in and around the town of Northwich in Cheshire. Trans. Inst. Min. Engineers, Vol. 19, 1900, pp. 241-262.

STEPHEN WATSON.

DURHAM.

Recent Mineral Deposits and their Relation to Vein Formation [examples from local mines referred to]. Trans. Weardale Nat. Field Club, Vol. 1, Part 1, 1900, pp. 57-62.

A. WATTS.

CHEVIOTLAND.

Geological Notes on Holy Island [a brief notice of the Carboniferous strata, the raised beaches, sand-dunes, etc.]. Nat. Hist. Trans. North Durh. and Newc., Vol. 13, pp. 421-422.

W. W. WATTS (Secretary).

YORKSHIRE, LANCASHIRE, ETC.

Photographs of Geological Interest in the United Kingdom.—Tenth Report of the Committee [includes several northern county records, particularly a large series from the Yorkshire Geological Photographs Committee to which however credit is not properly given]. Rep. Brit. Assn., 1899, publ. 1900, Dover Meeting, pp. 377-397.

F. E. WEISS.

LANC. S.

On a biserial Halonia belonging to the genus Lepidophloios [on the evidence of a specimen of Halonia from the Hough Hill Colliery, Staly-

bridge, shows that stems exhibiting the structure of *Lepidodendron fuliginosum* (Williamson) should be referred to the genus *Lepidophloios*]. Rep. Brit. Assn., 1899, publ. 1900, Dover Meeting, p. 927.

* EDGAR D. WELLBURN.

YORK S.W.

On the Occurrence of *Strepsodus sulcidens*, Handcock and Atthey, in the Yorkshire Coal Measures [describes a fine mandibular ramus in the Brighouse Museum, obtained from the Yorkshire Coal Measures]. Proc. Yorks. Geol. and Polyt. Soc., Vol. 14, Part 1, 1900, pp. 86-87.

EDGAR D. WELLBURN.

YORK S.W.

On the genus *Megalichthys*, Agassiz: its history, systematic position, and structure [refers to the specimen in the Leeds Museum, etc.]. Proc. Yorks. Geol. and Polyt. Soc., Vol. 14, Part 1, 1900, pp. 52-71.

EDGAR D. WELLBURN.

YORK S.W.

On *Rhadinichthys monensis*, Egerton, and its Distribution in the Yorkshire Coalfield [the remains of this fish are mostly found in a fragmentary condition; but it has a wide distribution, and occurs in several of the coal-seams in the Lower and Middle Coal Measures]. Geol. Mag., June 1900, pp. 260-263.

LIONEL B. WELLS.

LINCOLNSHIRE.

Section of Strata above the Barnsley Coal passed through in the Borehole at South Carr, Lincolnshire. Trans. Manch. Geol. Soc., Vol. 27, 1900, pp. 57-64.

J. E. WILSON.

YORK MID W. AND S.W.

Geology [of the Bradford District; prepared in connection with the British Association Meeting]. Handbook to the Neighbourhood of Bradford, 1900, pp. 118-133.

ETHEL M. R. WOOD.

LAKE DISTRICT.

The Lower Ludlow Formation and its Graptolite-fauna [gives details of the Zones in which certain species of graptolites occur, and compares the lithological and palæontological features of the graptolite-zones of various districts]. Quart. Journ. Geol. Soc., Vol. 56, May 1900, pp. 415-492; Abstract in Geol. Mag., June 1900, pp. 276-278, and Nature, 12th April 1900, p. 578.

HENRY WOODS.

LINC. N.

A Monograph of the Cretaceous Lamellibranchiata of England. Part II. [recording *Trigonia robinaldina*?, *T. keepingi*, *T. nodosa*, and *T. tealbyensis* from the Lower Cretaceous strata of Tealby and Claxby]. Palæontog. Soc., Vol. 54, 1900, pp. 73-112, plates xv.-xix.

A. SMITH WOODWARD.

YORK MID W.

On a New Species of *Deltodus* from the Lower Carboniferous (Yoredale Rocks) of Yorkshire [found by the Rev. Addison Crofton, M.A., in the dark-coloured limestone of the Yoredale series in Blackthorn Farm, between Long Preston and Slaiddburn, North Yorkshire; the specimen is named *Deltodus croftoni* after its discoverer]. Ann. and Mag. Nat. Hist., May 1900, pp. 419-420, and plate 10, figs. 2, 2a, and 2b.

HENRY WOODWARD. See 'T. Rupert Jones.'

H. B. W[OODWARD].

NORTHERN COUNTIES.

Scenery and Geology [Review of 'The Scientific Study of Scenery,' by John E. Marr; the Lake District, Yorkshire, etc., briefly referred to]. Nature, 8th March 1900, pp. 441-442.

DAVID WOOLACOTT.

DURHAM.

On the Boulder Clay, Raised Beaches, and Associated Phenomena in the East of Durham. Proc. Univ. Durham Phil. Soc., Vol. 1, pp. 247-258.

Naturalist,

NOTES AND COMMENTS.

HERRING GULL'S NEST.

The accompanying photograph of a typical nest of the Herring Gull (*Larus argentatus*) was taken on the cliffs not far from Whitby, and illustrates a paper by the late R. Lofthouse in the Proceedings of the Cleveland Naturalists' Field Club (Vol. 1, Part 4), just issued. The nests were sometimes quite exposed, sometimes sheltered under ferns and grasses; they were made of dried grass and feathers, and varied



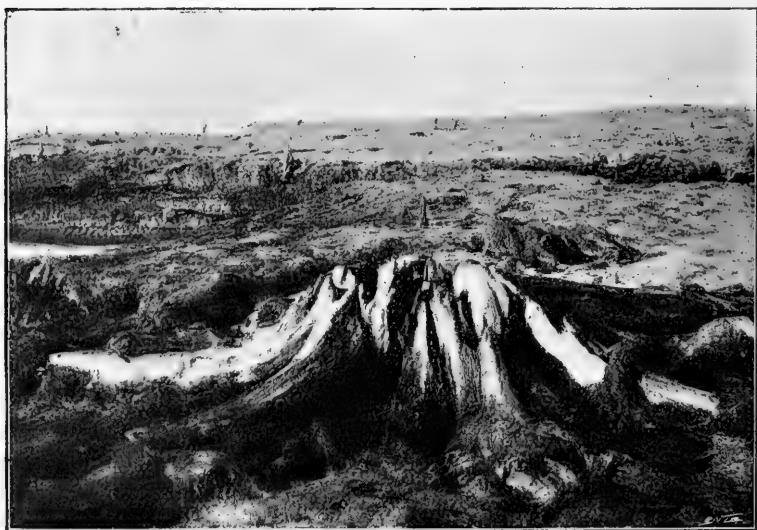
Herring Gull's Nest.

considerably in bulk and construction. The same author has notes on the Snow Bunting. The Editor, the Rev. J. Hawell, contributes an admirable paper on 'The Evolution of Cleveland Scenery,' in which he gives particulars of some valuable work he has carried out in the district, principally in reference to the Glacial deposits. There are several other papers, those of particular local interest being 'Cleveland Lepidoptera,' by T. A. Lofthouse; 'Cleveland Coleoptera,' by M. Lawson Thompson; and 'Ornithological Notes,' by C. Millburn.

COAST EROSION.

The hills are shadows, and they flow
From form to form, and nothing stands ;
They melt like mist, the solid lands,
Like clouds they shape themselves and go.

The question, of coast erosion is always an interesting one, and to some people a serious one. The amount of land annually wasted around our coast by the ceaseless assailing of the sea, as shown by the reports of the British Association Coast Erosion Committee, is truly alarming. Messrs. George Newnes Ltd. have just published a very useful summary of the subject, by Beckles Willson, in their shilling 'Story' series. In this the



Submerged Forest on the Cheshire Coast.

author refers to the amount of land wasted, from the earliest records, in various parts of the country. Of particular interest to our readers are his descriptions of the erosion of the Holderness and Cheshire coasts, which are illustrated by maps, photographs, etc. (one of which, showing the 'submerged forest' on the Cheshire coast, is here reproduced, by the kind permission of the publishers). Particulars of the 'submersion' of many hundreds of square miles of territory, and no fewer than thirty-four towns and villages, are enumerated, and we quite agree with the author's opinion that in view of the

importance of the subject it is a pity there are no Parliamentary statistics, although there is scope for valuable official investigation.

A NEW MANCHESTER FIELD CLUB.

Notwithstanding the numerous scientific societies in Manchester, the recent appearance of Part 1 of the Proceedings of the newly-formed 'Manchester Field Club' clearly indicates that this society is doing excellent work, and there seems every appearance of it continuing to do so. The part issued contains 136 pages, which are occupied by reports of indoor and outdoor meetings, lectures and addresses, etc. Amongst the latter are 'The Oxlip and its relations with the Cowslip and Primrose in England,' by Charles Bailey (illustrated); 'Geology of



Askern Pool, Yorkshire.

Dunham,' by Mark Stirrup, etc. The society goes far afield in its excursions, and curiously enough the only photograph shown in illustration of the rambles is of Askern Pool, in Yorkshire, showing the growth of *Hippuris vulgaris*, here reproduced. The size of the pages is rather larger than we like to see, but this is the only complaint we have to make with the publication. With Mr. Mark Stirrup as president, Mr. A. Griffiths as secretary, and Mr. C. Bailey as editor, the success of the society is assured.

NATURE STUDY.

The increased interest now being taken in Nature study must be most gratifying to all naturalists. It is also a pleasing sign to find the educational authorities doing so much to encourage the study of natural history amongst children. Various articles on the subject have also appeared in the popular magazines. One of these, of particular interest, occurs in the April 'Royal Magazine' from the pen of Mr. Wilfred Mark Webb. In this the writer reviews the work accomplished in various Yorkshire and other schools, and illustrates his remarks by several well-chosen illustrations, one of which is here reproduced by the courtesy of the editor. It represents a group of Bootham boys on a Nature study excursion in a district familiar with our readers. 'Pearson's Magazine' for



Bootham Boys on a Nature Study Excursion.

the same month also contains two illustrated papers of interest to naturalists, viz., 'The Migration of British Birds,' by Harry F. Witherby, and 'Do Monkeys Speak,' by R. L. Garner.

BRITISH BRONZE AXES.

It is remarkable what a large number of hoards of British bronze axes have been found in the northern counties from time to time. Sometimes as many as forty have been unearthed together, and in many instances they were evidently in the possession of the bronze casters, as they are not unfrequently in the rough. In one or two instances the moulds used for casting have been found with the hoards. One of the most recent discoveries was made last year near Urswick, Furness. This

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consisted of six socketed axes, and has been described by Mr. Harper Gaythorpe in the 'Transactions of the Cumberland and Westmorland Antiquarian and Archæological Society,' just published. Two of the axes are quite plain, the other four being ornamented with ribs and pellets. One specimen is evidently a spoilt cast, and was no doubt intended for remelting.



British Bronze Axes.

Another has never been used, but is just as taken from the mould, the edge being a quarter of an inch thick. The largest specimen is five inches long and weighs 14 oz., the smallest is four inches long and weighs $10\frac{1}{2}$ oz. Five of the examples are here shown through the kindness of the editor of the Transactions.

GEOGRAPHICAL DISTRIBUTION OF VEGETATION IN
YORKSHIRE.

A paper of the greatest interest and value to botanists, bearing the above title, by Dr. Wm. G. Smith and Mr. C. E. Moss, appears in the April number of the 'Geographical Journal' of the Royal Geographical Society. This forms Part 1 of the Botanical Survey of the County, and deals with a portion of the West Riding extending from Penistone to Keighley northwards and from Todmorden to Castleford eastwards. It is illustrated by nine photographs and accompanied by an excellent map, coloured to show the distribution of the dominant types of vegetation; the map is a half inch to the mile reproduction of the field maps prepared during the progress of the survey. A limited issue of special reprints with text, and cloth-mounted map, pocket size, will shortly be available, and may be obtained from Messrs. J. Bartholomew & Co., Edinburgh, or from the authors. We hope to give a detailed notice of this paper in our next issue. We understand that Part 2, which will deal with the Harrogate to Skipton district, will probably be ready in June.



BEETLES AND ELECTRIC LIGHT.

E. G. BAYFORD,
Barnsley.

ARTIFICIAL light has long been known as an attraction for moths, and lepidopterists have used this knowledge to advantage in their quest of certain genera. Other orders of insects are attracted, although in a lesser degree, beetles amongst them. At the beginning of the collecting season it may be as well to draw the attention of coleopterists residing in areas where the electric light has been installed to this fact. A little time devoted to a careful examination of the standard and the ground within a radius of nine feet around it will not be altogether thrown away. My time for observation during 1902 was very limited, and the results consequently meagre. The following notes will, however, indicate the minimum of success.

The families principally represented are the Carabidæ and Lamellicornia. There is something ludicrous in the sight of a wingless *Carabus nemoralis* essaying time after time to climb a standard, only to fall as often to the ground. One evening there was quite a swarm of a common *Amara*. These, par-

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ticularly the former, might have been there for business purposes. Just as the Bats circle round and round the lamps and hawk from one to another, picking off the moths which often swarm, and as the cats at the foot wait for those which fall stunned by contact with the lamp, so the beetles may have discovered what an ample supply of food assembles there. Almost any night in the season *Aphodius rufipes* and *Geotrupes spiniger* will occur. The Silphidæ also is well represented. In this neighbourhood *Necrophorus humator* is of common occurrence, while *ruspator*, *vespillo*, and *mortuorum* are by no means infrequent. But the best species I have hitherto met with is *Necrodes littoralis*, which I have taken only in this way. It is an uncommon species, but easily taken, either when at rest on the standard, or on the ground, stunned by impact with the lamp.

FURTHER NOTES ON YORKSHIRE PLANTS IN THE BICHENO HERBARIUM AT SWANSEA.

REV. H. J. RIDDELSDELL, M.A.,
Aberdare, South Wales.

DR. F. ARNOLD LEES writes some very interesting details concerning the records from plants now at Swansea, published in 'The Naturalist' for November 1902. I will quote some of his remarks:—'The old school men exchanged and corresponded much as the hortosiccans of to-day do, and the source of many of the North-west and Mid-west Yorkshire specimens is easily obtainable. For example, all your 1839, 1840, and 1841—or nearly all—were gathered by the late Dr. J. Deakin Heaton, of Leeds. I hold corresponding specimens from his herbarium. Likewise the peripatetic botanist Henry Ibbotson . . . used to wander up and down the dales and further afield, Teesdale, Clova, etc., collecting for gentlemen willing to pay a trifle for plants from places they had not time to visit. And he used to send Mr. Motley plants—usually with loose labels of bluish paper, written in a neat sloping bank clerk hand . . . Likewise John Bohler, of Sheffield in Derbyshire, circa 1821-30. And Brunton for Woods, 1774-1800. . . .

As to *Vaccinium uliginosum* Bicheno's is *not* the first 'record' for Yorkshire. The name appears in Dr. J. Fothergill's list of Wensleydale plants (he lived at Carr End, Semerwater, about

1750), contributed to Whitaker's Richmondshire. . . . It was found "in a pasture called 'Rough Earth' at Mossdale Head," by Mr. J. Brunton, about 1775, and a specimen sent to Joseph Woods [and inferentially to Bicheno also]—who (J. W.) makes a note to the foregoing effect in Townsend's copy of Old Botanist Guide (1805), which was originally Woods's copy.'

Dr. Lees's comments show a combination of close acquaintance with facts, and of bold deduction from facts, which almost carries one the whole way. As regards *Vaccinium uliginosum* and Brunton's discovery of it in Wensleydale, quite the whole way: and no doubt Mr. Baker's account of the plant in the second edition of 'North Yorkshire,' p. 335 of No. 15 of the Y.N.U. Transactions, needs reframing in the light of the facts stated by Dr. Lees; my remark in 'The Naturalist' for November 1902, p. 337, was based (in too loosely-worded a form) upon Mr. Baker's account.

But Dr. Lees's *inferences* are not quite persuasive. The statement that 'all your 1839, 1840, and 1841—or *nearly* all—were gathered by the late Dr. J. Deakin Heaton, of Leeds,' may be true; but the *evidence* for its justification is wanting. I believe I am right in saying that there is no evidence on Motley's labels or sheets that any of his plants came either from Heaton or Ibbotson, or Bohler; while the 'inferentially to Bicheno also,' of the *Vaccinium*, overlooks the fact that the record is for 1775, while Bicheno was not born till about 1785! Dr. Lees commits the same oversight in chronology in a further remark on the *Meum* record. Moreover, why should not Motley have been in Yorkshire in 1839, 1840, and 1841? It is not at all probable that he procured *by correspondence* from Yorkshire a large number of quite common plants, easily obtainable on the spot in South Wales. The case needs much more careful investigation in this particular direction before Dr. Lees's inferences can be accepted; though to have turned one's attention to the matter, and to have effectively aroused interest in it, earns for Dr. Lees a further gratitude for the ever-accumulating good work done by him for botanical knowledge.

Mr. Petty kindly writes, with respect to the records of Bicheno ('The Naturalist' for November 1902), that Dow Craggs (p. 340), the locality catalogued for Lancashire, is in 'V.C. 69; an outlier of Coniston Old Man.' The plant 'was first recorded for North Lancashire portion of V.C. 69 by either Willisel or young Merrett in Merrett's *Pinax*, 1666, from the Old Man,' though the hill was not mentioned by that name.

SOME POINTS IN THE BIOLOGY OF HEPATICÆ.

F. CAVERS, B.Sc.,
Yorkshire College, Leeds.

If one may judge from the number of additions which have been made to the literature of the Hepaticæ during the last few years, it would appear that the study of this group of plants is growing in favour with botanists in this country, who now have in Mr. W. H. Pearson's 'Hepaticæ of the British Isles' a splendidly-illustrated work of reference, besides the handy and inexpensive 'Key to the British Hepaticæ,' by Mr. Macvicar, and the useful 'List of the British Hepaticæ,' by Mr. Lett.* The object of the present paper is to set forth briefly some of

the outstanding facts in the biology of the Hepaticæ, leaving out of account the organs concerned in the propagation of the species and dealing solely with the vegetative organs, with special reference to the various

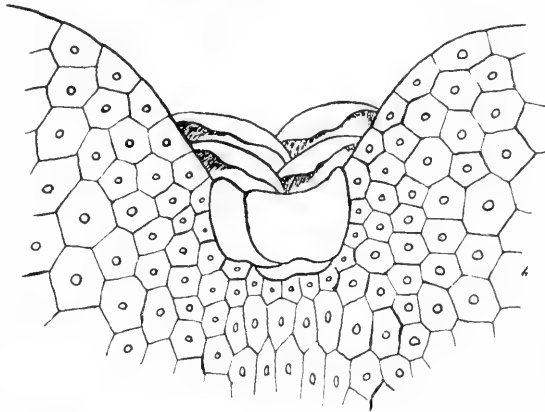


Fig. 1.—*Fegatella conica*. Growing point from above, showing the reflexed scales and the areolation of the thallus. $\times 10$.

ways in which these are modified and adapted to the special needs of the plant.

Most people who are interested in plant-life are familiar with the ribbon-like or thalloid shoots of *Marchantia polymorpha* and *Lunularia cruciata*, which are so often seen covering the soil in greenhouses, the green branched thallus usually bearing on its upper surface the characteristic circular (*Marchantia*) or crescent-shaped (*Lunularia*) cups, which contain numerous small brood-bodies, or gemmæ. The surface of the thallus is divided up into polygonal areas, each area having in its centre a small light

* Lett, H. W., a list, with descriptive notes, of all the species of hepatics hitherto found in the British Islands. Eastbourne, 1902.

spot, found on closer examination to mark the position of a pore which leads into an underlying air-chamber. An allied form, commonly found growing in large patches on stones beside streams, is *Fegatella conica*, readily distinguished from *Marchantia* and *Lunularia* by the fact that the surface-marking of the thallus is much more distinct, both the areas and the pores being wider (Fig. 1). *Fegatella conica* is of historical interest, being the form to which Micheli in his 'Nova plantarum genera,' published in 1729 at Florence, gave the name *Hepatica fontana*, the generic name being suggested by a supposed resemblance between the branching ribbon-like thallus and the lobes of the liver. The statement, which has been handed down in many books even to the present day, that *Marchantia* and its allies are of medicinal use in liver complaints, apparently originated in an application of the old adage, 'similia similibus curantur.' The Hepaticæ are, from the economic point of view, an entirely useless group of plants, but to the student of plant-evolution they form perhaps the most important group of all, a group which is above all an extremely generalised and ill-defined one and includes forms showing a remarkable range in regard to structural complexity. The Hepaticæ occupy a unique position in the vegetable kingdom, serving as a connecting-link between the Algæ on the one hand and the Vascular Plants on the other.

One of the most convenient forms with which to begin a study of the biology of the Hepaticæ is *Pellia*, which is very widely distributed in this country, usually forming large patches on the banks of streams. The green, flattened, ribbon-like plant-body or thallus is attached to the soil by numerous colourless or reddish root-hairs. Its upper surface is smooth, not showing the pattern observed in the forms already mentioned; it is usually from ten to about fifteen cells in thickness along the middle line, the broad midrib passing gradually into the thinner lateral wings, which become reduced to a single layer of cells at the margin. The thallus consists throughout of compact tissue, the upper layers being made up of chlorophyll-bearing cells, whilst the lower layers are colourless; there is, however, no sharp limit between the green and the colourless regions. Two species of *Pellia* are abundant in Britain, and it is sometimes difficult to distinguish these when in the sterile condition, unless sections of the thallus are examined. In *P. epiphylla*, which is monœcious, many of the cells of the thallus have their walls strengthened by broad thickened bands, yellow or brown in colour; *P. calycina*, which is diœcious, does not show these

fibrous thickenings. Many of the cells contain brown spherical or elongated oil-bodies, usually six or seven in each cell. These bodies are evidently to be regarded as products of excretion; even after plants have been kept in total darkness for several weeks the oil-bodies remain unchanged in the older parts of the thallus, whilst the newly-formed branches contain them in abundance. Oil-bodies are found in a large number of Hepaticæ, and it has been found that they play an important part in the economy of the plant by rendering the tissues distasteful to snails and other animals, which rarely attack fresh plants, though they will eat pieces which have been soaked in alcohol to remove the oil and then washed in water. Very frequently, the cells forming the lower colourless portion of the thallus are found to be traversed by fungal hyphæ, which ramify through the cell-cavities and often bear swollen vesicles. The fungus-infested or mycorrhizal zone extends in the midrib to within a very short distance of the growing-point, and is especially well developed in the larger and more fleshy plants.* The growing-point lies at the bottom of the deep notch found at the anterior margin of each branch, and is occupied by a single large cell, the apical cell, from which are cut off new cells that give rise to the whole of the tissues. The superficial cells in this region grow out to form club-shaped hairs, which secrete mucilage, and this serves to absorb and retain moisture and to prevent the delicate newly-formed tissues of the growing-point from becoming dried up.

Starting from a relatively simple form like *Pellia*, the differentiation of the plant-body in the Hepaticæ may be traced along three diverging lines. (1) The thallus remains simple in external form, but becomes differentiated internally and may attain a highly complex structure. Beginning with *Riccia*, we have in the Marchantiales a beautiful series of forms showing gradual elaboration of the thallus. (2) The thallus remains simple as regards internal structure, but becomes differentiated into a cylindrical midrib and a single-layered wing on either side, e.g., *Metzgeria*. In some of the forms belonging to this type, the midrib shows a well-defined strand of long narrow cells with pitted walls, having a remarkable resemblance to the vessels of higher plants. The thallus may further become differentiated into a cylindrical basal portion which is colourless or brownish,

* The writer has recently observed a well-developed mycorrhizal zone in *Aneura pinguis*, fresh material of which was kindly sent by Mr. P. Furley, of Aberystwyth.

and creeps along the soil, and an ascending portion with broad green wings, e.g., *Pallavicinia Lyellii*. The wings often become folded or divided into lobes, or repeatedly forked and spread out like a fan. From such forms there is an almost insensible passage into the strictly foliose type (3), that of the leafy Jungermanniales, comprising the great majority of the species of Hepaticæ. Here we find a slender stem, bearing a row of

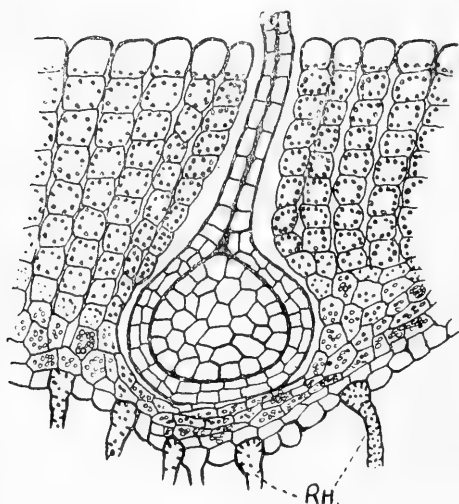


Fig. 2.—*Riccia glauca*. Part of a transverse section of thallus, with a fertilised archegonium containing a young capsule. $\times 50$.

leaves on either side, and often also a third row on the lower surface.

In *Riccia* and its allies the structure of the thallus is fairly simple. In the common *R. glauca*,* often found forming rosettes on damp soil, the branches of the thallus are narrow and strap-shaped, showing a median longitudinal groove on the upper surface, which is deepest towards the notch in which lies

the growing-point. In sections, the thallus is seen to consist of a compact colourless lower zone and a filamentous upper zone, each of the green filaments consisting of a single row of cells; between the filaments there are deep, narrow air-spaces (Fig. 2). The uppermost cell of each filament is larger than the rest, and forms, with the corresponding cells of the neighbouring filaments, a continuous epidermal layer. These epidermal cells contain colourless sap, with few chloroplasts or none at all; they doubtless serve to protect the underlying green cells from excessive illumination, besides partially closing the air-spaces and thus checking evaporation and at the same time preventing the entrance of water into these spaces. The lower surface of

* For an excellent supply of living plants belonging to this species, the writer is indebted to the kindness of Mr. Geo. Webster, York. Material of other British species was also kindly sent by Mr. W. H. Pearson.

the thallus bears long, colourless root-hairs and a series of thin green scales; each of the latter becomes after a time split in the middle, but the two lateral rows of scales thus formed ultimately become withered in the older parts of the thallus. In the species of *Riccia* which grow in drier and more exposed situations, e.g., *R. nigrella*, the scales, which are large and violet-coloured, appear to play an important part in enabling the plant to resist the effects of extremes of temperature or of prolonged periods of drought. Under such adverse conditions the plant becomes

rolled up, with the ventral surface outwards, covered by the closely-overlapping scales. In other species with a similar xerophytic habitat, e.g., *R. ciliata*, *R. tumida*, the epidermal cells on the upper surface, especially at the margins of the thallus, grow out as long, colourless hairs, which doubtless serve to retain water. In *R. cristallina*, which grows on wet stones in streams, the air-spaces become drawn out into

wide chambers which remain open above, forming a series of shallow cavities separated by thin vertical partitions. These partitions form a network, as seen from above, and give this species its remarkably crystalline appearance in the fresh and moist condition; the ventral scales are very small, each consisting of a short row of cells and soon becoming withered off. In *Ricciella fluitans* the air-spaces grow in width, but at the same time the epidermal cells grow out horizontally so as to form a roof over each chamber. If the plant is growing on the soil the roofing-in of the chambers remains incomplete, a small pore being left above each chamber, but in the sterile aquatic plants, which grow submerged in water, the chambers are completely closed. In *Ricciocarpus natans* the broad heart-shaped thallus is thick and spongy, consisting almost entirely of air-chambers

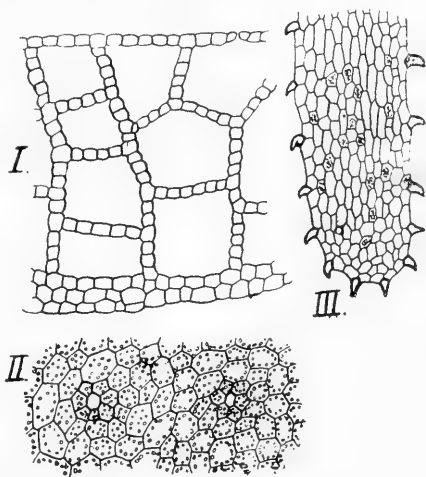


Fig. 3.—*Ricciocarpus natans*. I., Part of a transverse section of the thallus; II., epidermis in surface view, showing two pores; III., terminal portion of one of the long pendant scales. $\times 30$.

arranged in several tiers and separated by thin partitions (Fig. 3). Each of the uppermost chambers opens by a pore, whilst the superposed chambers communicate with each other by means of small pores in the partitions. The sterile floating plants bear no root-hairs, but are provided with numerous long strap-shaped scales which hang down into the water. The terrestrial fruiting form of *R. natans* is, however, provided with root-hairs, and the ventral scales become fewer, shorter, and broader, whilst the air-chambers are less developed than in the aquatic form, the compact ventral tissue increasing in thickness at the expense of the upper spongy tissue. In the case of *Ricciella fluitans* the result of transferring the aquatic plants to a solid substratum is to induce the development of root-hairs, whilst the ventral scales, which are very small and apt to be overlooked in

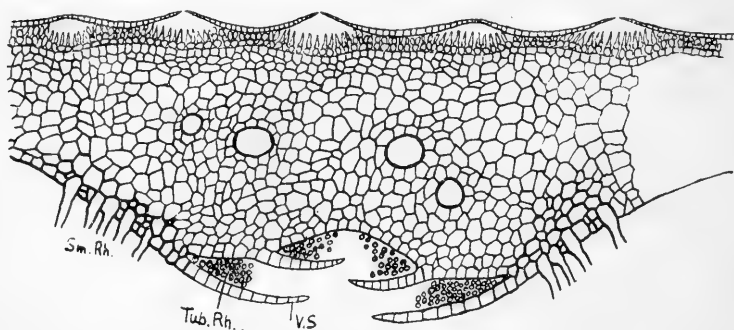


Fig. 4.—*Fegatella conica*. Transverse section through midrib of thallus showing the upper zone of air-chambers and the lower zone of compact tissue, with four of the mucilage sacs. Sm. rh., smooth-walled root-hairs; tub. rh., tuberculate root-hairs; v. s., ventral scales. $\times 30$.

the aquatic form, become much larger; the new branches lose the characteristic strap-like form and are shorter and broader, as in the ordinary terrestrial species of *Riccia*.

In *Fegatella conica* the air-chambers are arranged in a single layer; they are wide but shallow, separated from each other by thin vertical partitions, and roofed over by the single-layered epidermis (Figs. 4-6). All the cells bounding the chambers contain chlorophyll, and those forming the floor grow up into short filaments, each ending in an elongated cell which is produced into a pointed colourless beak (Fig. 5). The compact tissue below the air-chambers is thickest in the midrib; in the wing on either side it is reduced to four or five layers of cells, gradually thinning out towards the margin of the thallus. In the midrib the compact tissue is traversed longitudinally by

several strings of cells which contain mucilage. Very often there is a well-marked zone of cells extending across the midrib and containing densely interwoven fungal hyphæ; this mycorrhizal zone generally lies immediately below the air-chambers. The lower surface of the midrib bears two longitudinal rows of ventral scales, each scale consisting of a nearly circular free portion which is reddish or purple in colour, and a basal colour-

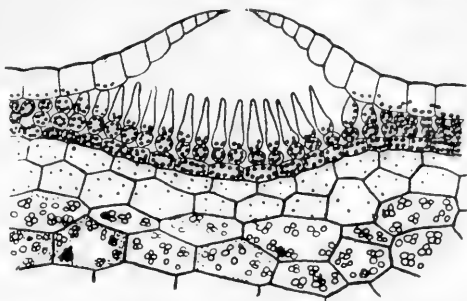


Fig. 5.—Fegatella conica. Part of a vertical section of the thallus, showing an air-chamber, lined by pointed cells and opening above by a pore in the epidermis. $\times 180$.

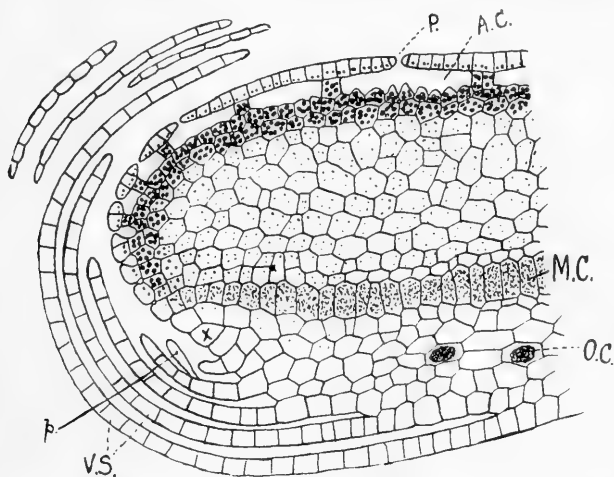


Fig. 6.—Fegatella conica. Longitudinal section through growing point of thallus. X., initial-cell; P., pore; A. C., air-chamber; V. S., ventral scales; M. C., mucilage cells; O. C., cell containing a large oil body. $\times 180$.

less portion which is attached to the side of the midrib by its outer margin, whilst its inner margin overlaps the scale next in front. The notch in which lies the growing-point of each branch is partly filled by the overlapping coloured appendages of the younger scales, which bend upwards and backwards over the growing-point (Fig. 6). From the sides of the midrib there

spring tufts of wide smooth-walled root-hairs which pass straight downwards into the soil and often have branched ends. Besides these root-hairs, which serve to attach the plant and to absorb water, we find narrower ones which spring in small tufts from the bases of the ventral scales and which pass backwards, lying in a groove on the lower surface of the midrib and covered by the overlapping scales. Each of these narrow root-hairs shows on the internal surface of the cell-wall a series of peg-like ingrowths, and it would appear that root-hairs of this type serve both to conduct and to store up water, which may be retained between the hairs as well as within them.

It is in the higher Marchantiales, including *Fegatella* and its allies, that the thallus reaches the highest type of internal differentiation. The different forms belonging here, though all more or less polymorphic, varying in structure as well as in external habit when growing in different surroundings, are readily distinguished on examining sections of the thallus. Each genus shows its own characteristic features which remain constant and enable us to identify the plant even in the absence of fertile specimens. Confining our attention to the British forms, we find that in *Marchantia*, *Lunularia*, *Preissia*, and *Targionia* the structure of the thallus is similar in ground-plan to that found in *Fegatella*, the tissue being differentiated into (1) an epidermal layer, one cell thick, forming a roof over (2) a single series of air-chambers, each opening by a pore in the epidermis and containing numerous green filaments which arise from the floor; (3) a compact zone of colourless cells, underlying the air-chambers and forming the greater part of the midrib but becoming reduced to a thin layer in the lateral wings; (4) root-hairs and scales arising from the lower surface of the midrib and showing the same arrangement as in *Fegatella*. In *Lunularia* and *Targionia* the pores are of the same type as in *Fegatella*, each pore being surrounded by several concentric rings of cells which all lie in nearly the same plane, but in *Marchantia* and *Preissia* the pores are 'barrel-shaped,' each being bounded by four or five superposed rings of cells forming a hollow cylinder (Figs. 8, 9). In all these forms the compact tissue contains oil-bodies, which are large and spherical or ovoid in form and occur singly in the cells. In *Preissia* and *Targionia* there is almost invariably a well-developed mycorrhizal zone in the midrib, the cells being often nearly filled by the branching fungal hyphæ, which bear in some cases large vesicles.

(To be continued.)

FUNGI OF MASHAM AND SWINTON.

CHARLES CROSSLAND, F.L.S.,

Halifax; Hon. Sec. Yorkshire Mycological Committee.

LAST year Mr. W. A. Thwaites, of Masham, continued his investigations into the fungus flora of Masham and Swinton, commenced in August 1901 (vide 'The Naturalist,' January 1902, pp. 21-31). The district worked lies between the two places named and is mostly in the valley of the Burn; 116 species have been added to the 416 met with in 1901. They will be found classified in the following list, with host, habitat, and date when collected, added. None are new to the British flora. A few hosts, attacked by parasitic fungi, are given in addition to those generally found in the text books, viz.:—*Cœoma orchidis* on *Gymnodena conopsea*; and *Dasyscypha calycina*, the larch disease on the Weymouth pine and Spruce fir. The number of herbaceous-plant parasites in the shape of Uredines is a noticeable feature; 17 were noted in 1901, and to these 21 more have been added. Out of 66 British species of *Helotium* Mr. Thwaites has succeeded in collecting no less than 20. The dates show that fungi of one kind or another are to be met with all the year round.

BASIDIOMYCETÆ.

AGARICACEÆ.

Agaricææ.

Leucosporææ.

Amanita Pers.

A. muscaria (L.) Fr.

Also from Jervaulx.

Lepiota Fr.

L. amianthina (Scop.).

In a pasture, March.

Tricholoma Fr.

T. terreum

var. *atrosquamosum* Chev.

In open woodland.

T. gambosum Fr.

In pasture, May.

T. sævum Gillet.

In meadow, October.

T. nudum (Bull.).

In wood-side pasture, October.

T. brevipes (Bull.).

In wood-side pasture, March.

1903 May 1.

Clitocybe Fr.

C. phylophila Fr.

On dead oak leaves, October.

C. pithyophila Fr.

In a wood, March.

C. cyathiformis Fr.

On the ground in a moist wood.

C. laccata (Scop.) Laccaria B. & Br.

var. *amethystina* Bolt.

On the ground in a wood, October.

Collybia Fr.

C. nummularia (Bull.).

Among grass, road-side, March.

Mycena Fr.

M. saccharifera B. & Br.

On dead bramble, June.

M. discopoda Lév.

On dead twigs, August.

Pleurotus Fr.

P. serotinus (Schrad.).

On dead stump, November.

P. chioneus (Pers.).

On dead branch, May.

Lactarius Pers.

L. serifluus (DC.) Fr.

Among grass, November.

Russula Pers.

R. rubra (DC.) Fr.

Lentinus Fr.

L. cochleatus Fr.

On decaying stump, July.

Panus

P. stypticus (Bull.) Fr.

*Ochrosporæ.***Flammula** Fr.

F. inopoda Fr.

On fir stump, April.

*Melanosporæ.***Panæolus** Fr.

P. fimicola Fr.

In pasture, April.

Psathyra Fr.

P. corrugis (Pers.).

In pasture, April.

Psathyrella Fr.

P. gracilis Fr.

Among grass, road-side.

POLYPORACEÆ.**Polyporus** Mich.

P. Rostkovii Fr.

On dead stump, July.

P. elegans Fr.

On dead stump, August.

P. petaloides Fr.

On dead stump, August.

Fomes Fr.

F. igniarius Fr.

On stump, Sole Beck Gill, and
near Swinton, July and Sept.**Poria** Pers.

P. obducens Pers.

HYDNACEÆ.**Hydnum** L.

H. repandum L.

In wood-side pasture, October.

H. alutaceum Fr.

On pine rail, April.

CLAVARIACEÆ.**Clavaria** Vaill.

C. fusiformis Sew.

Among grass in pasture, Sept.

C. rugosa Bull.

On bare soil, November.

THELEPHORACEÆ.**Corticium** Fr.

C. sebaceum (Berk.).

Covering old rope laid on the
ground, June.

C. lacteum Fr.

On wood, April.

Cyphella Fr.

C. capula Fr.

On moist dead branch, March.

TREMELLACEÆ.**Tremella** Dill.

T. frondosa Fr.

On oak stump, November.

UREDINACEÆ.**Melampsoreæ.****Melampsora** Cast.

M. epitea (Kze. & Schm.).

On Salix viminalis, August.

M. vitellina (DC.).

On Salix fragilis, August.

Coleosporium Lév.

C. senecionis Pers.

= Peridermium pini Chev.

Æcid. on pine leaves (Pinus syl-
vestris), April and May. Uredo.
and Telento. on Senecio vulgaris,
August.

C. sonchi (Pers.).

Æcid. on Tussilago farfara, May.

Puccineæ.**Uromyces** Link.

U. geranii (DC.).

Æcid. on Geranium pratense, June.

U. valerianæ (Schum.).

Æcid. on Valeriana dioica, May.

U. parnassiæ (DC.).

On Parnassia palustris, July.

U. poæ Rabh.

Æcid. on Ranunculus ficaria,
April; on R. repens, May.

U. rumicis (Schum.).

On Rumex acetosa, July.

U. alchemillæ (Pers.).

On Alchemillæ vulgaris. Uredo.,
April.

U. ficaria (Schum.).

On Ranunculus ficaria, April.

Puccinia Pers.

P. pulverulenta Grev.

On *Epilobium montanum* in garden. *Æcid.*, June; Teleuto., August.

P. pimpinella (Straus.).

Æcid. on *Anthriscus sylvestris*, May.

P. menthæ Pers.

On garden mint, 26th May. Mostly *Æcid.*; Teleuto. pustules just beginning to show on the leaves. Same on *Mentha arvensis*.

P. caricis (Schum.).

Æcid. on *Urtica dioica*.

P. obscura Schröt.

Æcid. on *Bellis perennis*, 30th October.

P. suaveolens (Pers.).

On *Carduus arvensis*, May.

P. hieracii (Schum.).

On *Hypochaeris radicata*, 27th April; *Leontodon hispidus*, 28th May; *Hieracium pilosella*, 4th June.

P. centaureæ Mart.

On *Centaurea nigra*, July.

P. betonicæ (Alb. and Schw.).

On *Stachys Betonica*, 19th April.

P. fusca (Relhan.).

On *Anemone nemorosa*, April.

P. bunii (DC.).

On flower stalks of *Bunium flexuosum*, 19th April.

P. valantiæ Pers.

On *Galium cruciata* = *Valantia cruciata* L., 18th May.

Phragmidium Link.

P. fragariastrum (DC.).

On *Potentilla fragariastrum*.

Cæoma

Cæoma orchidis Alb. & Schw.

On *Gymnodena conopsea*, *Orchis latifolia*, and *Listera ovata*.

ASCOMYCETÆ.

PYRENOMYCETÆ.

Erysiphe Hedw.

E. polygona (DC.).

On garden pea, September.

Sphæria

S. spermoides Hoffm.

On decorticated wood, July.

S. acuminata Sow.

On dead herbaceous stem, June.

Hypoxylon Bull.

H. fuscum Fr.

On hazel twig, April.

Nectria Fr.

N. episphæria Fr.

On an effused; decaying pyrenomycete, April.

Cordyceps

C. entomorrhiza Fr.

On dead pupa partially buried in soil, August.

C. militaris (L.) Fr.

On dead beetle at the roots of grass, August.

ONYGENACEÆ.

Onygena

O. equina Pers.

On decaying sheep horn, March.

DISCOMYCETÆÆ.

Morchella

M. esculenta (L.) Pers.

Among grass and dead leaves, shaded road-side, May.

Mitrophora

M. gigas (Pers.) Lév.

On sand among thin grass, river-side, May.

Helvella

H. crispa (Scop.) Fr.

Mitrule

M. phalloides (Bull.) Chev.

= *M. paludosa* Fr.

On dead leaves in swamps, July.

Geoglossum

G. glabrum Pers.

Among grass, October.

Vibrissia

V. Guernisaci Crouan.

On dead sticks in water, March.

Geopyxis

G. cupularis (L.) Sacc.

On the ground among moss in woodland, June.

Peziza Dill.

P. reticulata Grev.

On the ground.

Humaria Fr.

H. convexula (Pers.) Quel.

On soil among moss, October.

Lachnea Fr.

L. coprinaria (Cke.) Fr.

On cow dung.

Sclerotinia

S. tuberosa (Hedw.) Fckl.

Growing from sclerotia in a bed of *Anemone nemorosa*, April.

S. Curreyana (Berk.) Karst.

Growing from sclerotia formed in the interior of previous years' rush stems (*Juncus*), April.

S. Duriaëana (Tul.) Quel.

Growing from sclerotia on decaying *Carex*, May.**Ciboria**

C. ochroleuca (Bolt.) Sacc.

(= *Hym. firma* Phil.)

C. amentacea (Phil.) Fckl.

On fallen male-catkins of *Alnus glutinosa*, March.**Helotium** Fr.

H. imberbe (Bull.) Fr.

On decaying wood of *Alnus glutinosa*, April.

H. pallescens (Pers.) Fr.

On dead wood, March.

H. aureum Pers.

On dead twigs partially overrun by moss, July.

H. virgultorum (Vahl.) Karst.

On dead twigs, March.

H. gramineum Phil.

On decaying grass stems, May.

Mollisia Fr.

M. atrocinerea (Cke.) Phil.

On herbaceous stems, June.

M. mercurialis (Fckl.) Sacc.

On dead stems of *Mercurialis perennis*, June.**Tapesia**

T. fusca (Pers.) Fckl.

var. *rosea* Mass.On dead stems of *Rosa*, June.**Pseudopeziza** Fckl.

P. benesüeda (Tul.) Mass.

On dead Alder-branches, March.

Dasyscypha Fr.

D. crucifera (Phil.) Sacc.

On dead twigs, July.

D. lætior (Karst.).

On decaying raspberry canes (*Rubus Idæus*), July. Karsten in his latest description says:— 'Differs from *D. bicolor* in the septate paraphyses and thinner, closely septate hairs, and in growing only on *Rubus* species.'

D. calycina Fckl.

= *Peziza Willkommii* Hartig.On Scotch fir (*Pinus sylvestris*), February; Weymouth pine (*Pinus strobus*), February; Spruce fir (*Abies Douglassii*), February.

It appears from the above that this fungus is not confined to larch and Scotch fir, but infests the Weymouth pine and Spruce fir also in this country.

Cenangium

C. abietis (Pers.) Rehm.

On *Pinus sylvestris* and *P. strobus*. A saprophyte on dead, fallen, fir branches, but in these cases the fungus was at work before the dead branches had parted from the trees, Feb.**Ombrophila**

O. clavus (A.&S.) Cke.

On decayed grass stems, May.

Orbilia

O. leucostigma Fr.

var. *xanthostigma* Rehm.On wood, also on a *Corticium* partially enveloping the wood, August.**Caloria**

C. fusarioides (Berk.) Fr.

On dead nettle-stem, June.

Coryne Tul.

C. urnalis (Nyl.) Sacc.

On dead wood, October.

Phacidium

P. multivalve Kze. and Schmidt.

(= *P. ilicis* Phil.).

On dead holly leaves, May.

PHYCOMYCETÆ.**Peronospora**

P. arenaria Tul.

On *Cerastium triviale*, June.

Pilaria

P. anomala Schræa.

On dung of wood pigeon, June.

HYMENOMYCETÆ.**Oidium**

O. monilioides Link.

On grass leaves. The conidial stage of Erysiphe graminis, May.

Cephalosporium

C. acremonium Corda.

On rush stems, June.

Aspergillus

A. glaucus Link.

On decaying leaves, September.

Botrytis

B. fascicularis (Corda.) Sacc.

On dead thistle-stems, May.

B. cinerea Pers.

var. sclerotiphila Sacc.

On dead stem of some Umbellifer, April.

Ovularia

O. obliqua Oud.

On living leaves of Rumex obtusifolia, April. Said to be the conidial stage of Sphærella rumicis.

Cephalothecium

C. candidum Bon.

On bark, June.

Helminthosporium

H. dendroideum B. & Br.

On dead twig, July.

Isaria Pers.

I. arachnophila Ditm.

On dead spider laid among moss in a wood.

MYXOMYCETÆ.**Stemonitis**

S. typhina Roth. Fl., Germ. I. 527 (1788).

Arcyria Hill.

A. rubiformis (Pers.) Mass.

On moss, June.

Didymium Schrad.

D. farinaceum Schrad.

On leaves, May.

Craterium Trent.

C. confusum Mass.

On herbaceous stem, April.

Physarum Pers.

P. sinuosum (Bull.) Rost.

On herb stems, grass, moss, etc., September.

Leocarpus

L. fragilis (Dicks.) Rost.

On grass stems.

FUNGI.

Nottinghamshire Fungi. In the 'Transactions of the Nottinghamshire Naturalists' Society' for 1897-8, a list of all then-known Nottinghamshire Basidiomycetous Fungi was given; and this was supplemented in the 'Transactions' for the following year by a few additional records. To these lists may now be added three more species of considerable interest, viz., *Cyathus striatus* Hoffm., found growing gregariously on a piece of rotting sack-cloth, half buried among dead leaves and chips of bark in a woodyard at Wollaton, on 3rd January 1903; *Geaster Bryantii* Berk., Arnold, 5th January 1903, on ground in hedge-bank; *Pleurotus applicatus* Batsch., on rotting log, Arnold, 4th November 1902. I am indebted to Mr. Carleton Rea, M.A., Secretary to the British Mycological Society, for these identifications.—J. W. CARR, University College, Nottingham, 21st January 1903.

THE POLLARD WILLOW.

MAX E. PEACOCK.

The Manor, Bottesford, Lincolnshire.

IN early days, when our village life was governed by Manor Courts, instead of Rural District Councils, the wants of the inhabitants were regarded. At that date Willow trees played a part of no inconsiderable importance. From them were procured the pegs with which the thatch of reed, rushes, or straw was held firmly on house, barn, and stacks; they also were used as stakes for staithing the banks of rivers and becks. Wooden scoops, bowls, spoons, trenchers, and cheese vats were of this wood, and in fact it played a very important part in our domestic architecture. Old manor rolls show that laws were in force regarding their planting and protection. At a manor court held at Bottesford, North Lincolnshire, on 1st April 1579, the following, among other regulations, was decreed by the lord and jury:—‘Item, that everie husbandman within this lordshippe to sett euery yere vj willowes, and euery cotiger iij, and to preserve them from cattle; in doing the contrary euery husbandman to forfayte xijd, and euery cotiger vjd.’

From this extract we gather how it came about that against ponds and hollows in our meadow and pasture lands little clumps of Willows may be seen yet standing. The date at which some of these old patriarchs of past rural economy were planted must be considerable. We can remember some that had grown hollow with age that would contain four ordinary men standing up within the trunk. The Pollard Willow seems to be able to retain life and flourish when the entire bole is eaten out by grub, beetle, and caterpillar; the outer rim of bark and an inch or two of wood only is needed for the growth of a good crown of branches. These ancient trees have been chopped, buckheaded, or pollarded for generations, yet in spite of age and ill-usage they still put forth a goodly crop of long, straight shoots after each application of the bill-hook.

It is not so much of the trees themselves we are about to write as about the birds, beasts, fishes and reptiles, plants and shrubs that we have known make use of them in one way or another. We have a note about some Willows that to the best of our belief were planted as stakes about 150 years ago, but an earlier date might be assigned to them by some people. On looking through these notes we find a list of birds that have built in

them. In 1869 these two old trees furnished the site for nests of the following birds: Starling (*Sturnus vulgaris*), Sparrow (*Passer domesticus*), Tree Sparrow (*P. montanus*), Spotted Flycatcher (*Muscicapa grisola*), Stock-Dove (*Columba oenas*), and the Great and Blue Tits (*Parus major* and *P. cæruleus*). At the same time the following plants had found a root-hold in the decaying wood, leaves, and soil that had collected on their ancient crowns:—Gooseberry, Bramble, Elder, Raspberry, Briar, grass of various sorts, and the Male-fern. On the stems of the trees were several funguses, the only one worth remark to us as young folks being one which is locally called the Colts-foot fungus. The name is given on account of its appearance, which is very much like a horse's foot when in an unshod, natural state.

Some other Willows we have notes of have not been planted so long, but they have begun to play their part in helping the reproduction of nature at their own expense. In 1867 we found a Thrush (*Turdus musicus*)'s nest in the crown of a Willow that stood along with others on the pond side, but it was in an unfinished state. However all went well and the eggs soon followed the completion of the nest, the eggs hatched into birds, which took wing in due course, and the nest was untenanted for a short time. However on paying it a visit one day some time later, we discovered that a Wren was making a nest on the underneath side of the old Thrush's nest; this nest also prospered, and again the young birds were reared beneath the shade of the leaves of the Willow. When this later lot had betaken themselves to wing we did not pay much attention to the nests, but on passing it we noticed that the autumn showers had caused fermentation to take place in the materials of the nests, and the heat had caused the seeds of grasses carried by the Thrush as nest material to germinate. Both grass and small weeds, not recorded by name, were growing on the mass of sodden material that had been the home of two happy families that season. Later on, when snow and sleet were blowing across moorland and fen, a Long-tailed Field Mouse took up her abode here and made a store-room of the top nest and a sleeping-room of the Wrens' nest below. Here the fawn-coloured, white-bellied, little creature, with its long, tapering tail, would often be seen when the spring came running up the gnarled stem; but she deserted the spot in the early days of April. She, however, had left a trace of her occupation. Amongst her store of winter provisions were some hips from

a sweet briar-bush which grew in the garden hard by. One of the seeds that she had not nibbled put forth roots, and before the end of summer was growing into a little sprig. The grasses of the previous year had seeded, and these also sprung up, only to die down after reproducing their kind, the hot August weather being too much for them. However, the briar thrived and grew. The mere sprig of twenty odd years or more ago is now a large bush with long trailing branches reaching down to the waters of the fish-pond. The bole of this Willow is about six feet in length, but wind and weather have made the old pollard trees lean somewhat at an acute angle over the pond, some of the boughs hanging into the water itself. Here in the spring comes the Toad (*Bufo vulgaris*), with her husband at her back, to twine her string of eggs from twig to branch and branch to twig. Perch (*Perca fluviatilis*), Roach (*Leuciscus rutilus*), Dace (*L. vulgaris*), and Tench (*Tinca vulgaris*) love this place, as also does the slimy Bream (*Abramis brama*), for in winter the depths of the pool are warm and in summer's heat the trees make a cool shade. The Kingfisher (*Alcedo ispida*), too, has a particular liking for this spot and haunts it frequently. On one occasion a Fox (*Vulpes vulpes*) that was hard pressed made for some Willow trees we know well. He could easily mount up the inclined trunk, and when once amongst the boughs he found no difficulty in getting into a fairly snug place, on a limb that reached some fifteen feet over the pond; here he remained, the hounds being quite at fault. Those who had watched him were by far too pleased with his clever action to betray his lurking-place. Badgers (*Meles meles*) and Otters (*Lutra lutra*) have both been known to lay up and bring forth young in the fastnesses of its roots. The roots extend many feet into the high bank that borders on the pond. Otters are now no more, and the Badger is nigh extinct in the district we speak of; but yet an odd one comes at times, and when this is the case the Willow row bank is sure to become his home as long as he makes a sojourn in the neighbourhood. From the tallest and largest Willow grows a Mountain Ash tree, whose bright scarlet berries tempt many a bird to come and feed. Brambles, Elders, Raspberry, Gooseberry, Briars, Thorns, Blackthorn, and various grasses and other plants have taken root in one or another of the decaying crowns. For years now the axe and bill-hook have not been used, so they form quite a thick mass from each stole top. Birds of various orders come here each season to nest as sure as the spring arrives. Waterhens,

(*Gallinula chloropus*), Coots (*Fulica atra*), and Dabchicks (*Podiceps fluviatilis*) have chosen the long, trailing boughs that hang across the water as an anchorage for their nests. Wild Ducks (*Anas boschas*) have also bred in the stoles amongst the branches on more than one occasion. In fact the old trees do more towards helping nature to reproduce her kind than any other trees we wot of. A list of plants, animals, birds, reptiles, and fish that make use of the Willow would indeed be remarkable both for length and variety. From fungi to foxes is a large field of observation, but the Willow furnishes examples of all life between these two. Not only has this been the case, but both lads and men have sheltered within the crumbling boles when a thunder-shower has caught them when fishing. Snug and dry in the Willow retreat they still could fish in spite of thunder, hail, and rain.

What curious shapes some of these old remnants of our ancient manorial system have; some are bent double like unto old men, others lean, some this way some that, yet others again are nearly cleft in twain from crown to root, still they put forth new wood and leaves. They truly are picturesque in decay as well as being handsome in their prime. Fox-hunters have a kindly feeling for this tree, because they point out to them the dangers ahead; they know well that these trees grow beside brooks, deep drains, ponds, and in boggy, trappy places, and steer clear accordingly.

LINCOLNSHIRE GALLS.

REV. EDWARD ADRIAN WOODRUFFE-PEACOCK, L.Th., F.L.S., F.G.S.,
Vicar of Cadney; Hon. Sec. Lincolnshire Naturalists' Union,

AND
Miss S. C. STOW,
Brandon, Grantham.

THE nomenclature adopted is that of E. Connold's 'British Vegetable Galls,' and to the author our thanks are due for much kind help in naming specimens.

North Lincolnshire V.C. 54 contains Divisions 1-12, South Lincolnshire V.C. 53 Divisions 13-18.

The asterisk (*) means on the authority of Rev. E. A. W. Peacock and the dagger (†) on the authority of Miss S. C. Stow.

Adelges abietis L. On *Abies excelsa*, N. Div. 2, Broughton, 1896, *.

Andricus curvator Htg. On *Quercus pedunculata*, S. Div. 13, Court Leys, September 1902, Thomas Stow.

- Aphilotrix fecundatrix** Htg. On *Quercus pedunculata*, S. Div. 13, Court Leys, 1902, †.
- Asphondylia pimperlæ** F. On *Daucus Carota* L., N. Div. 5, Kirton-Lindsey, August 1902, *.
- Aulax glechomæ** Htg. On *Nepeta Glechoma* Benth., N. Div. 2, Bottesford Moors, 27th June 1902, *.
- Aulax hypochæridis** Kieffer. On *Hypochæris radicata* L., N. Div. 3, Howsham, September 1901, *.
- Aulax papaveris** Cam. On *Papaver Rhæas* L., N. Div. 2, Broughton Wood, 13th August 1902, *.
- Biorhiza aptera** Fbr. On *Quercus Robur* L., N. Div. 2, Broughton Lane Plantation, August 1902, *.
- Brachycolus stellariæ** Hardy. On *Stellaria Holostea* L., N. Div. 2, Bottesford, 1893, *; on *Stellaria graminea* L., S. Div. 13, Court Leys, September 1902; Haddington, September 1902, †.
- Cecidomyia bursaria** Bremi. On *Nepeta Glechoma* L., S. Div. 13, Court Leys, September 1902; Div. 14, Cranwell, October 1902, †.
- Cecidomyia cratægus** Wtz. On *Cratægus monygnia* Jacq., S. Div. 13, Caythorpe, August 1902; Haddington, September 1902, †; Div. 15, Sapperton, September 1902, †.
- Cecidomyia marginem-torquens** Wtz. On *Salix viminalis* L., N. Div. 2, Bottesford, 1902; Div. 3, Cadney, 1902, *.
- Cecidomyia rosaria** Lw. On *Salix alba* L., S. Div. 15, Brandon, September 1902, †.
- Cecidomyia persicariæ** L. On *Polygonum amphibium* L. and the vars. *terrestre* Leers and *hirtulum* Van. Bise., S. Div. 13, Court Leys, August 1902, †.
- Cecidomyia rosarum** Hardy. On *Rosa canina* L., S. Div. 15, Brandon, September 1902, †.
- Cecidomyia sisymbrii** Schrk. On *Sisymbrium officinale* Scop., N. Div. 3, Cadney Beck bank, July 1902, *.
- Cecidomyia Ulmariae** Bremi. On *Spiræa Umaria* L., S. Div. 13, Caythorpe, September 1902; Haddington, September 1902, †.
- Cecidomyia urticae** Perris. On *Urtica dioica* L., N. Div. 2, Scunthorpe, 1902; Div. 3, Cadney, 1899, *; S. Div. 13, Court Leys, September 1902; Haddington, September 1902; Div. 14, Cranwell, October 1902; Div. 15, Sapperton 1902, †.
- Cecidomyia veronicae** Bremi. On *Veronica Chamædrys* L., N. Div. 1, Amcotts, 1878; Div. 2, Bottesford, 1874; Div. 3, Cadney, 1891-1901; Caistor, 1902, *; Div. 2, Scunthorpe, 1902; Div. 10, Revesby, 1901, †; S. Div. 13, Fulbeck, 1896; Leadenham, 1896; Caythorpe, 1902, *; Div. 13, Harmston, 1900; Coleby, 1900; Haddington, 1902; Div. 14, Cranwell, October 1902; Div. 15, Sapperton, 1902 †; Div. 15, Great Ponton, 1902, *.
- Ceuthorhynchus sulcicollis** Gzll. On *Brassica napus*, N. Div. 2, Bottesford, 1893; Div. 3, Cadney, 1896; Div. 5, Kirton-Lindsey, 1900, *; S. Div. 13, Court Leys, November 1902, Thomas Stow; on *Brassica rutabaga*, N. Div. 2, Bottesford, 1876; Hibaldstow, 1899-1902; Div. 3, Cadney, 1891-1902, *; S. Div. 13, Court Leys, February 1903, †; on *Brassica Sinapistrum*, N. Div. 2, Hibaldstow, July 1902, *. But only found when looked for on ground which had lately been 'roots.'*
- Cynips Kollari** Htg. On *Quercus pedunculata*, S. Div. 13, Court Leys, 1902; Haddington, 1902, †.
- Diastrophus rubi** Htg. On *Rubus plicatus* W.&M., N. Div. 1, Amcotts, 1878; Div. 2, Bottesford, 1876; Div. 3, Cadney, 1898, *; on *Rubus cæsius* L., S. Div. 15, Stubton, February 1903, †. Many of the pupæ had been picked out of these galls by birds.†

(To be continued.)

REVIEWS AND BOOK NOTICES.

A list, with descriptive notes, of all the species of Hepatics hitherto found in the British Islands, by Henry William Lett, M.A., M.R.I.A., Rector of Aghaderg, co. Down. Price 7s. 6d., to be obtained from the author, Aghaderg Glebe, Loughbrickland, co. Down, Ireland.

This is one of the latest additions to the literature of the British Hepaticæ. By the title of the book the author only offers to give a list of all the known species of these plants hitherto found in the British Islands with descriptive notes.

He states in the preface that the language of the work is not that usually found in botanical books, which needs the assistance of a dictionary of botanical terms, but simple plain English.

For conciseness of description the use of the simple botanical terms generally employed appear to be much more appropriate than the words 'back' and 'front' applied to the description of a plant. The author gives an explanation of his reason for the use of these terms, from which it may be gathered he describes the 'front' of a leaf or stem as the upper or antical surface, and the 'back' as the under or postical surface.

Some of the botanical terms in general use, such as areolæ, bracts, calyptra, capsule, elaters, gemmæ, etc., are used by abbreviations, which the author explains, and to these might have been added the words antical and postical for the upper and under surface of leaf and stem.

There are 61 names of genera given in the list, with short descriptive characters of each. In the descriptive notes of the 243 species, the most distinctive characters of each are printed in italics, which is a help to the student, but as many are difficult to determine without the aid of drawings, Mr. Pearson's work, 'Hepaticæ of the British Isles,' with figures and descriptions of all known British species, will still be required. Mr. Pearson has followed the classification of the late Dr. R. Spruce, whose classical work, 'Hepaticæ Amazonicæ et Andinæ,' published by the Edinburgh Botanical Society, 1884, is one of the best works on this tribe of plants ever written. The 'Conspectus Hepaticarum' of Spruce, in which he arranges these plants into sub-orders, tribes, and sub-tribes, is by far the most natural arrangement we have seen, and is now generally followed by all the best writers on them, both on the continents of Europe and America.

Canon Lett might have given an outline of it and arranged his 61 genera after this 'Conspectus'; it would have added greatly to the value of his list, and possibly not much to the cost of the book.

The names of the species in this work are, without exception, printed with small initial letters. We consider it better that specific names given in honour of eminent botanists or travellers should be prefixed by capital letters, as is the general rule amongst botanists.

In the December number of the 'Journal of Botany' for 1902, p. 422, there is a comprehensive notice of this work by S. M. M., to which our readers' attention may be called. Several inaccuracies are there pointed out which should not have occurred, seeing that the descriptions have been recently drawn up in nearly every instance from freshly-gathered specimens. Canon Lett has followed Dumortier by placing the *Jungermania Doniana* Hook in the genus *Bazzania* Gray, see page 173, which is perhaps the greatest error in the book.

Spruce described amongst his South American gatherings a sub-genus of *Jungermania* under the name *Anastrophyllum*, and considers *J. Doniana* H. the one European species belonging to this group. It certainly is not a *Bazzania*, and if not put under Spruce's sub-generic name, it would have been better kept as *Jungermania Doniana* Hook (for this see the description of *Anastrophyllum* Spruce in 'Journal of Botany' for 1876, p. 235).

The index in Canon Lett's book is novel in having the specific names placed before the generic ones, and we cannot see any advantage in departing from the plan generally followed.

The book will be useful to beginners, and students get in a handy form, at a cost within the reach of all, a very comprehensive list of the British

Hepaticæ and a good working book which will be a great help in their studies of this interesting but difficult group of plants.

There is a good bibliography, which includes a list of the best works of British and Continental writers on this tribe, and adds much to the value of the book.

We may call attention more particularly to two papers by the late Dr. R. Spruce. The first is on *Marsupella Staberi* n.sp. and some allied species of European Hepaticæ, by R. Spruce, published in the 'Revue Bryologique' for 1881, page 89. This is a most excellent treatise, and although published in a French periodical it is written in English, and is an excellent account of the division of the old genus *Jungermania* into the more modern numerous genera. The second is the pamphlet on *Cephalozia* (a genus of Hepaticæ), its sub-genera and some allied genera, by Richard Spruce, printed for the author at Malton, 1884. This is a brochure of 96 pages, in which is given the key to the new classification of the Hepaticæ adopted by the author in his great work, 'Hepaticæ Amazonicæ et Andinæ.' Both these are treatises of the greatest value and learning, and the careful study of which will much assist all students of the British Hepaticæ.—M. B. S.

The twenty-sixth annual report of the Lancashire and Cheshire Entomological Society has just been issued, and is principally devoted to an illustrated paper on 'Our Cockroaches,' by Mr. E. J. Burgess Sopp. The Society has also issued, separately, a catalogue of its library.

The Conchological Society of Great Britain has just issued a valuable census of the 'British Land and Freshwater Mollusca,' by Lionel Adams. Unfortunately, the reprint does not give the names of the referees by whom these specific determinations of the shells submitted for record have been made.

'The Proceedings of the Liverpool Naturalists' Field Club for the Year 1902' has been published. It is principally occupied by an interesting botanical résumé (including a description of the field meetings of 1902), by Miss E. M. Wood.

'The Fiftieth Annual Report of the Nottingham Naturalists' Society' (for 1901-2), just issued, contains two papers. The first is the presidential address of Mr. W. Bradshaw, in which he reviews the work of the society during the half-century; the second being by Mr. J. J. H. Teall, on 'The Life History of a Mountain Range.'

Probably few provincial cities can boast of so successful an Astronomical Society as Leeds, the tenth Journal and Transactions of which (for 1902) are just to hand. It comprises nearly 100 pages, every one showing that the society is essentially a working society—the names appearing in the list of officers being a guarantee for this. The various aspects of astronomy are dealt with by different writers in a particularly able manner. An excellent portrait of the 'late' president, Mr. H. J. Townsend, forms a frontispiece.

The Transactions of the City of London Entomological and Natural History Society for 1902, issued February 1903, price 2s., contains reports of meetings with summaries of the more important exhibits, list of members, and annual report. Several papers of interest read before the society are also included, the more important being 'Observations on the early stages of *Phyllocnistis suffusella* Zell.,' by A. Sich, '*Stauropus fagi*,' by A. W. Mera, 'Lepidoptera in British Guiana in 1901,' by W. J. Kaye, and 'Importance of certain larval characters as a guide to the classification of the Springids,' by A. Bacet.

'Familiar Wild Birds,' with coloured plates, is being published in 6d. instalments by Messrs. Cassell & Co.

From the 'Quarterly Journals of the Northants Natural History Society and Field Club' it would appear that the society is in a flourishing condition, and blessed with a goodly number of able workers. The journals contain several interesting articles, archæology, geology, botany, and meteorology receiving particular attention. They are also well illustrated, the reproduction of Mr. Roberts' photograph of Maidwell Dale being a work of art. Mr. Beeby Thompson contributes several geological papers, and Mr. H. N. Dixon has a good paper on Liverworts. We should hardly accept the Rev. T. W. Freckleton's record of a palæolith 'in the boulder-clay cliffs at Hornsea, near Hull' (p. 149). If the object is a true implement, which is doubtful, it will surely be of neolithic age, and much later than the boulder-clay.

FIELD NOTES.

BIRDS.

Great Spotted Woodpecker near Spurn.—On 10th March a male Great Spotted Woodpecker (*Dendrocopus major*) was seen near here.—P. W. LOTEN, Easington, 19th March 1903.

Raven near the Tees Mouth.—On 6th March 1903 a Raven, *Corvus corax* (male), was shot at Seaton Carew, on the north side of the Tees mouth. The bird was first noticed on 28th February, the day after the great gale, but is probably an escape. It committed considerable havoc amongst the poultry yards of the Seaton inhabitants before it was finally killed.—T. H. NELSON, Redcar, 10th March 1903.

Grantham Bird Notes.—The neighbourhood of Grantham is fairly good for birds. I have taken three or four cuckoo's eggs from the nests of as many Spotted Flycatchers. About 1890 I even found one of the grey variety in a Redstart's nest. The Great Crested Grebe nests in the Denton neighbourhood, and the Turtle Dove at Easton. Kingfishers are plentiful on the Witham and little streams. In 1900 the Spotted Woodpecker nested in Belton Park. Mr. R. Ringer, taxidermist, of this town, has also had the following birds to set up during the last eighteen months. A Waxwing from Easton; two Rufous Moorhens from Grantham; a Hobby from Boothby; a Nightjar from Gonerby; an Osprey from Stoke. A Golden Eagle was also shot some years ago at Stoke. Perhaps my own most interesting discovery was in an old tree which was blown down in Belton Park. Under the nest of the Tawny Owl which I knew was in this tree and had been for years, I found two

owl's eggs. They were of the same size, but, unfortunately, one was broken by the fall of the tree. The perfect egg measures $1\frac{3}{16} \times 1\frac{9}{16}$ of an inch. These are rather large eggs for this species, and must have been forsaken, as they were buried deeply in castings and old nesting places were above them.—J. ARTHUR NETTHAM, Grantham, September 1902.

Blackheaded Gull in Cumberland, 1705.—(Continuing the notes from Bishop Nicolson's 'Diaries' for North Country items, 'Naturalist,' 1901, September. 1902, June and July). On 5th June 1705, Bishop Nicolson writes, ' . . . In the evening, at y^e Bishop's Moss, we took Eggs and young ones of the white (black-cap't) Larus.' Trans. Cumb. and Westm. Antiq. and Archæol. Soc., Vol. 3, new series, pp. 11-12, 1903. The locality is near Carlisle.—S. L. PETTY, Ulverston, 13th April 1903.



FLOWERING PLANTS.

***Ononis repens* in Cumberland.** Mr. Geo. Gissing, the novelist, has given, no doubt unconsciously, confirmation of the fact, recorded by the late W. Hodgson, A.L.S., that *Ononis repens* L. (*inermis* Lange) is the more prevalent form on the coast line of Cumberland. He writes in the 'Private Papers of Henry Ryecroft,' 1903, p. 99, 'A little plant of which I am very fond is the rest-harrow. When the sun is hot upon it the flower gives forth a strangely-aromatic scent, very delightful to me. I know the cause of this peculiar pleasure. The rest-harrow sometimes grows on sandy ground above the sea-shore. In my childhood I have many a time lain in such a spot under the glowing sky, and, though I scarce thought of it, perceived the odour of the little rose-pink flower when it touched my face. Now I have but to smell it and those hours come back again. I see the shore of Cumberland, running north to St. Bees Head; on the sea horizon a faint shape which is the Isle of Man . . .' No child, one thinks, would lay its face on *Ononis spinosa* L. (*horrida* Lange).—S. L. PETTY, Ulverston, 13th April 1903.

Purple Variety of the Wood Anemone.—During a ramble in Margery Wood, south of High Hoyland, on the 13th April, I saw a fair-sized patch of *Anemone nemorosa* bearing deep purple flowers. I counted thirty-two within a space of about two yards, which formed quite a distinct contrast amid the thousands of blossoms of the ordinary white colour in the immediate vicinity.

—W. E. L. WATTAM, Newsome.

MOSES and LIVERWORTS.

Addition to Baugh Fell Mosses.—*Hypnum fluitans*, Gr. *exannulatum* var. *pinnatum* Boul., forma *acula* Sanio.—I found this rare moss on the shoulder of Baugh Fell, by the Rawthey river, and omitted to record it in my paper. In the 'British Moss Flora' it is recorded from Ben Lawers by Hunt, 1865, and Holt, 1880; and Mr. G. Webster, of York, has found it near Widdale Head, on the south-east of Baugh Fell. It is a distinct and interesting moss as forming the connecting link between var. *pinnatum* Boul. and var. *brachydictyon* Ren.—W. INGHAM, York.

Hepatics New to Yorkshire.—*Scapania rosacea* (Corda).—This I found on the bank of the river Tees, from High Force to Wince Bridge, in June 1897. It was in my herbarium as a small form of *S. æquiloba*; but, with fuller knowledge of this genus, it turns out to be *S. rosacea*. Herr Kaalaas, of Christiania, says that plants resembling mine in all essential characters grow generally on somewhat dry and shaded rocks in the neighbourhood of Christiania. *Kantia submersa* Arnell.—This I found in the Vale of Pickering, south of Goathland, on 18th August 1902. It grew in a wet, boggy place among Sphagna and the bog form of the hepatic, *Scapania nemorosa*.—WM. INGHAM, York.

NORTHERN NEWS.

The first field meeting of the Yorkshire Naturalists' Union for this year will be at Cowthorpe on the 9th May. Arrangements are being made and it is hoped that all who can will be present as the district is an exceptionally interesting one.

The following excursions have been arranged by the Yorkshire Naturalists' Union during the present summer:—

For York Mid W.—Cowthorpe, Saturday, 9th May.

For York S.E.—Filey, Whit-Monday, 1st June.

For York N.E.—Goathland, Saturday, 27th June.

For York N.W.—Bowes, week end, 1st to 3rd August.

For York S.W.—Wharnccliffe Craggs, Thursday, 3rd September.

The Fungus Foray will be held in the Helmsley district, from 26th September to 1st October.

In the March 'Entomologists' Record' Mr. F. H. Day records *Pselaphus dresdensis* for Cumberland.

At a recent meeting of the Linnean Society Mr. John Clayton expressed the opinion that the age of the Cowthorpe Oak, near Wetherby, had been greatly exaggerated, and that 500 years is the extreme limit of its age.

In the 'Twenty-fourth Annual Report of the Rochdale Literary and Scientific Society' reference is made to the approaching completion of the town's museum, when several collections in charge of the Society will be handed over.

The Leeds Naturalists' Club is undertaking a survey of the fauna and flora as now existing within the city boundaries.

'The Northern Scientific Club' has been formed in Newcastle 'to serve as a social meeting-place for men interested, professionally or otherwise, in scientific work.' The Hon. C. A. Parsons, F.R.S., is the president.

An earthquake caused a slight tremor through Derbyshire, Nottinghamshire, Staffordshire, Cheshire, and in South-West Yorkshire on 24th March. Professor Milne attributes the disturbance to 'some adjustment or slight slip on the line of a pre-existing fault or fracture in the earth's crust.'

In the 'Journal of Conchology' for April, C. H. Moore records the occurrence of *Vertigo alpestris* at Holker, Lancs., a new locality for this species.

In the 'Proceedings of the Manchester Field Club,' Vol. 1, Part I. (1899), issued January 1903, p. 48, is a record of *Viola ericitorum* Schrader. (*V. canina* Bab.) growing on a turf hill-slope overlooking the brook which runs from Maltby to Roche Abbey. This plant is not recorded for the Trent drainage district in Lees' 'Flora of West Yorkshire.'

Messrs. C. Crossland and J. Needham give an interesting account of 'The Flora of a Boulder in March,' in the April 'Halifax Naturalist.' Nineteen species of plants are recorded from one block of grit. In the same publication Mr. W. B. Crump has an interesting paper on 'The Roosting Habits of Rooks.'

We much regret to record the death of Mr. Edward Birchall, of Leeds, a member of the Yorkshire Naturalists' Union, which occurred on 6th April.

We would draw special attention to the offer on the cover of the 'Naturalist' made to readers of the journal, in order that they may secure back numbers at a cheap rate. The offer will be shortly withdrawn.

A memorial tower to the late Rev. F. O. Morris, the naturalist, was opened by the Archbishop of York, on the 16th April, at Nunburnholme, where Morris was Rector for 39 years. The cost of the tower and bells was £1,100.

Mr. W. H. Crofts has been elected President of the Hull Geological Society for 1903-4.

We should like to congratulate Mr. P. F. Kendall, F.G.S., a past president of the Yorkshire Naturalists' Union, on his election on the council of the Geological Society of London.

In the April number of the 'Journal of Botany' (Vol. xli., p. 113) Mr. Wm. West gives a detailed description of *Polygala amarella* Crantz. This milkwort was found by Mr. H. Andrews at Grassington nineteen years ago, and has been gathered frequently since. Last year Mr. John Cryer collected it in the neighbourhood of Grass Wood and Dibb Scar, and devoted some time in working out its distribution, an account of which he adds to Mr. West's description. The plant had frequently been named either *P. calcarea* or a form of *P. depressa* by British botanists, but on specimens being submitted to Prof. Chodat, of Geneva, he identified the plant as *P. amarella* Crantz. An excellent plate accompanies the account of the plant.

In the same number of the 'Journal of Botany' (pp. 115-126) Mr. William Ingham gives a list of the Mosses and Hepatics of the East Riding. We notice Mr. Ingham omits all mention of the Moss list in the 'East Riding Flora.'

Mr. George Daniel records a curious conflict between a bat and a starling in the Rectory garden at Huggate. The two were found locked together, the bat apparently having its teeth through part of the bird's beak the starling having hold of the bat's head. After being handled by the children they were put upon the lawn, when the starling placed its foot on the bat's head and released its beak, then flew away.





NEARLY COMPLETE ROOS CARR IMAGE.

NOTES AND COMMENTS.

AN EARLY SCANDINAVIAN RELIC.

In 1836, whilst excavating at Roos Carrs, near Withernsea, a model boat and warrior crew, carved in Scotch fir, was unearthed. The warriors were armed with shields and clubs, and had eyes of quartz. Poulson, the Holderness historian, briefly referred to the find in his work and figured the 'boat,' with one warrior. Since then the objects have been frequently described in antiquarian journals in England and abroad. Fortunately they were kept in the Hull Museum, though slightly mutilated. The



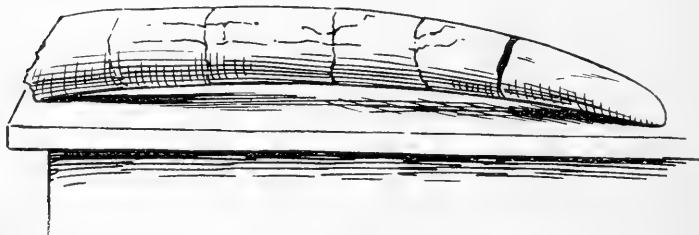
accompanying illustration shows the object in the museum, each figure being about fourteen inches high. It will be noticed that only one shield is shown. They prove to be of early Scandinavian (pre-Viking) age, and examples bearing very great resemblances* have been found in Scandinavia or the adjacent

* For detailed description and figures see Hull Museum Publications, No. 4, 1901. See also 'Reliquary,' April 1903, and Trans. East Riding Antiq. Soc., 1901.

German mainland. 'Idols' of wood, apparently of a somewhat similar character, are also referred to in the early Sagas. Quite recently a fifth wooden image was brought to light, which throws some light on the probable original appearance of the 'warriors.' With it was the right arm, bored for the reception of a club, and one of the top small shields, only known previously from Poulson's drawing. This is shown on Plate 3, and has been hidden away in private lands for three-quarters of a century. These objects are of particular value, as they probably are the earliest known traces of the invasion of this country by the Scandinavians. We are indebted to the editor of the East Riding Antiquarian Society's Transactions for the use of the illustrations.

MAMMOTH'S TUSK AT BROUGH.

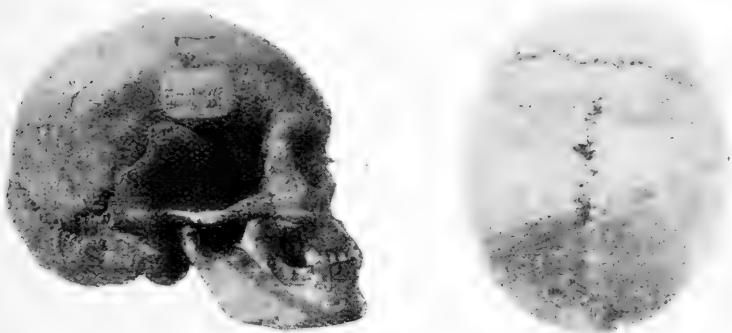
The neighbourhood of Brough, East Yorkshire, has yielded many interesting remains of extinct mammals. In the gravels on the top of Mill Hill, teeth, tusks, etc., of the Mammoth (*Elephas primigenius*), *Elephas antiquus*, Bison, Deer, Horse, etc., have been found from time to time. Some years ago a tusk ten feet long was recorded by Mr. G. W. Lamplugh.



Unfortunately it was too far decayed for removal. Later, a smaller tusk was obtained and sent to the York Museum. Another pit has now been opened on the hill, from which several portions of Mammoth tusk and teeth have been obtained. Recently a fine tusk, three feet four inches long, shown in the illustration, has been unearthed at a depth of nine feet. This was in a very friable condition when found, but after being treated with glue, etc., turns out to be a very fair specimen. It shows traces of crushing, and is rather damaged on the under side, where it rested on the clay. Mr. Featherstone has kindly placed the specimen in the Hull Museum, in company with other objects from the same locality.

PRE-HISTORIC BONE DISEASE.

Dr. W. Wright has contributed the results of an examination of eighty pre-historic East Yorkshire skulls (in the Mortimer collection) to the 'Birmingham Medical Review.' The bone disease usually took the form of tubercles and ridges on the skull. The bronze-age skull here figured, which is from a barrow on Painsthorpe Wold, shows a marked thickening of the frontal and parietal bones as they bound the coronal suture, and symmetrical



nodosities on either side of the anterior part of the sagittal suture. One skull showed conditions suggestive of syphilis, whilst other deformities were due to injury. One clear case of fracture was noted, on the frontal bone above the right orbit, which had healed with but little deformity. Amongst other bones in the collection several interesting features were noticed. The so-called osteoarthritis of the spine had apparently been a common complaint. This condition has been described 'as if the bony matter had been poured in a stream over larger surfaces of a bone and then congealed.'

TEETH OF EARLY MAN.

The excellent condition of the teeth in pre-historic skulls has long been envied by those living in more 'civilised' times. Dr. Wright reports that of all the teeth which he examined, and many of the skulls had their complement, only one was found to be carious. The occurrence of alveolar abscesses was indicated in five cases. It is pointed out that the comparative immunity of the molars is seemingly due to the rapid wearing down of their crowns to a flat surface by the dirt and grit mixed with the coarsely-milled grain, and by the pulps being quickly calcified.

MANX GEOLOGY.

Mr. G. W. Lamplugh's appointment to survey the Isle of Man a few years ago was hailed with satisfaction by all British geologists. From 1892 to 1897 Mr. Lamplugh worked assiduously at the geology of the island, evidences of which appeared occasionally in the 'Quarterly Journal' and elsewhere; his paper on the 'Crush-Conglomerates' being a remarkable piece of original work. Since 1897 the appearance of the completed Memoir on the Geology of the Island has been anxiously awaited. It has now appeared, and has certainly by far exceeded the most sanguine expectations. The favourable nature of the 'boundaries' to the area surveyed by Mr. Lamplugh has enabled him to complete his Memoir in a much more satisfactory manner than is usually found in the Survey Publications, and of this full advantage has been taken. The volume is surely as complete an account of the geology of the island as it is possible to prepare. It has over 600 pages, is well illustrated by numerous sketches, maps, sections, and photographs. It is divided into three sections: (1) Introductory, (2) Stratigraphy, and (3) Economic Geology. There are numerous appendices, and a very complete bibliography, including papers up to January 1903. Prof. W. W. Watts has prepared the petrographical descriptions. Whilst Yorkshire geologists have reason to regret Mr. Lamplugh's departure from his native county, they cannot but feel proud of the good work he is accomplishing elsewhere.

YORKSHIRE NATURALISTS AT COWTHORPE,**9th MAY, 1903.**

It rarely happens that the members of the Yorkshire Naturalists' Union meet in the field in such miserable weather as that experienced on the first excursion for the present year. Little evidence was visible of the 'merry month of May,' 'May fill-dyke' being far more applicable. The rain which had fallen during the few days prior to the excursion continued steadily and uninterruptedly all day on the 9th, to the discomfort of the members, numbering nearly a score, who had reached Allerton in the hopes of seeing something of Allerton and Ribston Parks, and the Cowthorpe Oak. The weather was cold, dykes were full to the brim, fields were in places flooded, the Nidd was swollen and turbid; in fact, were it not for an occasional fruit

tree in bloom, or the green on the hedges, or the note of the Cuckoo and the sight of Swallows, it would have been difficult for the members to have persuaded themselves that it *was* really May and not February.

But the Cowthorpe Oak, the main object of interest in the district, *had* to be seen, and was; but only after trudging through Hensingore, walking, or rather sliding, down steep lanes, wading through pools, and crossing fields sodden with rain. In this way the irregular surface of the morainic material was forcibly noticeable, the clay-lined depressions being occupied by miniature lakes.

The Oak, now a gigantic wreck, a mere relic of a former giant, was fully in keeping with its surroundings—a picture of misery; hollowed, split, shrunk, its branches propped up by numerous supports, fastened together by stout wire and nails, the upper parts quite dead, the lower ones sending forth young shoots and new leaves, which as summer comes on may show even more forcibly that there is life in the old tree yet. It was most obvious, however, that its days were numbered, and the members felt grateful to Mr. John Clayton, who had planted a sapling close by, reared from an acorn from the large tree.

According to Mr. Clayton's measurements made in 1899, the girth of the tree on the ground is 54 ft. 3 in., and its height 37 ft. Formerly the dimensions were much greater.

The members adjourned to the Walshford Bridge Inn, where the tea and meetings were held. The President, Mr. W. Denison Roebuck, occupied the chair. From the reports given by Rev. E. P. Blackburn, Messrs. R. Fortune, T. A. Lofthouse, E. Hawkesworth, J. Farrah, W. Ingham, H. Ostheide, and the President, it appeared that but little had been accomplished in the way of records. The President produced a fine Morell, which was destined for the table of the Union's first president on the following day.

Tea earlier than usual, for once there was ample time for the meeting. At this Mr. Roebuck presided, and after thanking the members for his election, referred to the circumstance that the first field meeting under the change of secretaryship was held under the shadow of the Cowthorpe Oak—precisely where, in 1877, the first *field* meeting of the Union was held, when Mr. Roebuck commenced his secretarial duties. Cowthorpe was planned to be the opening excursion of 1877, but was altered and became the second. Pontefract actually was the first place, but as the kindness of the local clergymen

in showing their churches exhausted the whole day, the members never actually got out into the field, and two important resolutions passed at Pontefract clearly defined the scope and the objects of the Union. First, it was resolved that the Society, which had hitherto borne the title of West Riding Consolidated Naturalists' Society, should extend its sphere to the whole county of York, and be henceforth known as the Yorkshire Naturalists' Union. An amendment that it be Yorkshire Naturalists' and Archæological Union was defeated by a large majority, and ecclesiastical and architectural archæology was definitely excluded, and it was understood that the Union dealt with the sciences essentially of *local* application, mainly zoology, botany, and geology, also meteorology and prehistoric archæology. Such sciences as astronomy, chemistry, physics, mathematics, which had no local application whatever, were not such as a society, holding field excursions and dealing with a definite topographical area, could discuss. The next resolution was of equal importance as defining the attitude of the Union as regards sight-seeing and leadership, and it emanated from the rank and file of the Union. It was resolved that the secretaries be instructed in future carefully to abstain from arranging visits to churches and field lectures, so that members might be free to engage in actual and active investigations. Leaders, of course, were necessary, but not lecturers, and their function was to be that of topographical experts and to conduct to points of natural history interest. These points being settled by spontaneous action of the main body of members and associates, the Cowthorpe district was the first visited by the Union under its now well-known title and initials, and the first scene of actual field work. And that day was the forerunner of many meetings at which new friendships were formed and old ones more firmly cemented.

The President went on to say that to himself the 21st May 1877 was memorable, as it first brought him into contact with Mr. John Emmet, the great pioneer of natural history research in those parts, and one of the most valued of the Union's supporters to the day of his death. At that time also Dr. Wesley, of Wetherby; Mr. John Harrison, of Wilstrop; Mr. J. Teunant, of Skewkirk; and Mr. W. J. Milligan, of Wetherby, were prominent as local workers, and afterwards their number was reinforced by Dr. Arnold Lees, who came to that district as the successor to Dr. Wesley. Of the survivors, the Union were fortunate in still having the services of Mr. J. Jackson and Mr. R. Andrews.

As might be expected, the reports of most of the sectional officers were 'maistly nowt,' as one member so aptly expressed it. The weather had been even too wet for the conchologists.

With regard to the botanical section, the Rev. W. Fowler states that the few mosses, fungi, and algæ collected proved to be very common ones, with the exception of *Morchella esculenta*, from Ribston Park. As some compensation for the wet day, it was interesting to see how well the Dandelion and Greater Stitchwort protected their pollen; the former by the closing of its capitulum and the latter by the bending of its stalk. A horse trough by the road-side so abounded in an alga, *Raphidium polymorphum*, as to cause the water therein to appear yellowish-green. Its breadth is about the $\frac{1}{7353}$ of an inch, in strong contrast to that of the Cowthorpe Oak, say 17 feet, yet each lives and multiplies, is equally adapted to its surroundings, and fills its appointed place in nature.

Mr. E. Hawkesworth, the president of the geological section, who had done his best to carry out his programme, reported that the district does not offer any very great attraction to the geologist. To the west of it the ridge of Permian rocks slopes gently away eastward, passing beneath the Bunter Sandstone, which is seen in only a few places, being covered by the vast glacial and post-glacial deposits of the Vale of York.

Probably because of the paucity of fossils, neither the Permian nor Triassic rocks of the district receive much attention, though they present many interesting problems.

Stretching from Boroughbridge to the north, in a southerly and easterly direction, is a series of well-defined ridges of glacial origin, terminating in the famous moraines at York. Provided better weather, these ridges would have afforded ample work for the few geologists present, as there are good sections cut into them at Flaxby, Clareton, Grafton, and Hopperton. A visit was made to one of these ridges, or series of ridges, occupying the ground between Allerton Park, Flaxby, and Clareton. The highest parts run up to the 200 feet contour line, but they are very irregular both in height and shape. Some time was spent in the examination of a pit near Flaxby village, where the stones are extracted and broken up for road metal. The section shows a considerable thickness of sandy material full of stones, varying in size from two feet to the smallest pebbles. There is no trace of stratification, the stones being distributed higgledy-piggledy, large and small, throughout the mass. Most of them are sub-angular, some well striated and polished. The most remarkable

feature of the section was the great variety of Carboniferous Limestone boulders, fine-grained, hard, black, grey and blue limestone, without traces of fossils; coarse and fine encrinital limestones, some highly crystalline; black limestones, with splendid corals; limestones with many *Producti* and other fossils; and cherts—truly a fine collection. There are a few coarse grits, more finer sandstones, but only two or three specimens of igneous rocks were seen. Evidently these ridges are of morainic origin, from the shape of the stones and their mode of occurrence. From wherever they came, the carrying agency must have passed over and picked them up from the outcrop of almost all the Carboniferous Limestones and Yoredale Rocks of North-west Yorkshire.

In conchology Rev. E. P. Blackburn records that the weather was too wet and cold for the animals to crawl about. At Hunsingore were found *Limax agrestis sylvatica*; *L. maximus*, small and typical; *L. fulvus*, a small dark form found not in the house but in a wall; *Arion hortensis*, adult, common and pale; *Hygromia hispida* var. *hispidosa*; and *Vitrea alliaria*. At Flaxby immature *Helix nemoralis* and *H. hispida*.

Votes of thanks were passed to the landowners for permission to visit their estates, and another to the Chairman for his services, and eight new members were elected.

Notwithstanding the weather, not one regretted his presence at Cowthorpe on 9th May. T. S.

FUNGI.

Fungi of Masham and Swinton: Corrections.—For *Leucosporeæ* read *Leucosporæ*; *Puccineæ* read *Puccinieæ*; *Discomyceteæ* read *Discomycetæ*; *Hymenomycetæ*, p. 181, read *Hyphomycetæ*.—C. CROSSLAND, Halifax.

***Geaster Bryantii* in Lincolnshire.**—Miss Susan Allatt sends from Nettleton, near Caistor, a rare and interesting fungus, viz., *Geaster Bryantii* Berkeley, distinguished from other distinctly pedicellate Geasters by its groove round the top of the pedicel, conical sulcato-striate peristome, and dark brown spores. It was growing under a Hawthorn hedge, and is two inches in diameter. It was gathered during the last week in March, and the endoperidium is still full of spores. A note on *Geaster fornicatus* will be found on page 288 of the September number of last year, and a correction on page 316 of that for October.—W. FOWLER, Liversedge Vicarage, 27th April 1903.

Naturalist.



BRITISH JET NECKLACE, FOUND IN A BARROW ON CALAIS WOLD.

NOTES ON SOME PREHISTORIC JET ORNAMENTS FROM EAST YORKSHIRE.

J. R. MORTIMER,

Driffield.

JET, sometimes called 'black amber,' is familiar to most people, and, like amber, has a vegetable origin, is easy to work, and takes a high polish. In Yorkshire it is found in situ in the Liassic shales near Whitby, and also occurs as pebbles in the Holderness Glacial beds and on the coast. It is likewise found in similar situations in France, Spain, and other parts of the Continent.

We first become acquainted with the manufactured form of the mineral in British graves, in the form of buttons, studs, pendants, beads, and necklaces.

The specimens in my own collection were found in 29 separate deposits with human remains, 23 occurring with inhumed interments, and 6 with cremated burials. They include 5 necklaces, 19 pierced buttons, 3 long links, 2 pendants of rough jet, 3 single beads, 2 dumbell-shaped studs, 1 spindle-shaped object, and 2 pierced circular rings—37 in all.

Of the necklaces, which consist of beads of various shapes, four (one of which consists of over 630 beads) accompanied inhumed bodies, almost certainly those of females, and one was found with cremated bones, probably also those of a female.

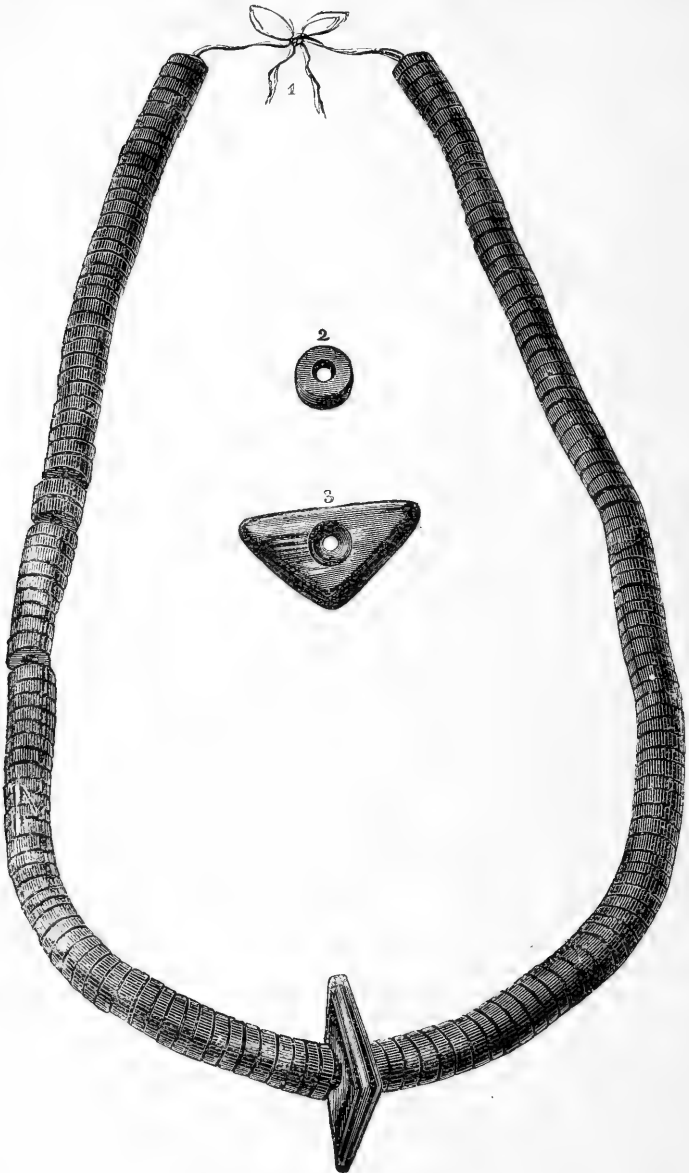
Of the nineteen buttons (Fig. 5) found with fourteen interments, all accompanied inhumed interments, except in three instances of cremated deposits with each of which a single specimen was found.

The three long links (Fig. 4) are of uncommon occurrence. Each accompanied an unburnt body, and their use is uncertain.

The two pierced pendants of rough jet had most likely been used as charms, suspended from the neck. One was found with a cremated body, and the other with an unburnt body.

Of the single beads two were with a cremated body, and the position of the third was not ascertained.

The two dumbell-shaped studs were found with the remains of a young female, and as they occurred one on each side of the neck it is possible they were worn as ornaments in the lobes of the ears.



Figs. 1-3.—Necklace and Ornaments of Jet (Barrow No. 75), in the Garton Slack Group.

The grooved spindle-shaped piece was found with a portion of a whorl of an ammonite, accompanying the remains of a youth. Probably both were deposited as charms.

The two pierced and ornamented rings are amongst the rarest and most skilfully made articles of jet found with British interments.

In addition to these jet articles there were also found accompanying interments a long oval button of amber and the greater portion of a hard wood button, both pierced in a similar manner to the jet ones.

All the above-mentioned specimens will be figured and fully described in my book now in the press,* a specimen illustration from which (Plate IV.) has been kindly lent by the publishers, Messrs. A. Brown & Sons. And it is to be hoped that these specimens, when no longer in my custody, will not be allowed to leave their native home, the East Riding.

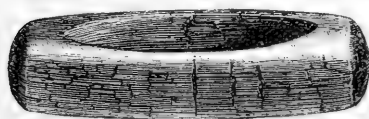


Fig. 4.—Jet Link, or 'Slider,'
from Aldro.



Fig. 5.—Jet Button or Stud,
from Bishop Wilton.

Besides those found in the graves I possess jet beads which have been found on the surface of the land at various times, but it is uncertain to what period they belong.

The Rev. Canon Greenwell, F.R.S., F.S.A., has also procured several examples from the barrows on the Wolds, adjoining my field of research. According to the particulars in his valuable book, 'British Barrows,' 16 interments have produced 26 jet articles, comprising 3 necklaces, 2 single beads, 12 pierced buttons, 6 rough pendants, and 2 pierced circular rings.

All these articles were found with inhumed interments except in three instances where they accompanied cremated bones.

In addition to these 26 articles Canon Greenwell, during excavations made since the publication of 'British Barrows,' found three or four more jet articles, bringing up the number to probably 30 specimens.† In the Canon's researches, as in mine,

* Forty Years' Researches in British and Saxon Burial Mounds of East Yorkshire, with over 1,000 illustrations.

† See *Archæologia*, Vol. LII. A very large jet link was found a short while ago in the 'Maiden's Grave' near Argam.

the necklaces and beads were found with female remains, while the buttons and rings accompanied the bodies of males.

In the Lake Dwellings at Ulrome Mr. T. Boynton, F.S.A., found two portions of jet armlets. The same gentleman gave some jet studs, etc., to the British Museum, which had been found in a barrow at Fylingdale.

Besides the discoveries already mentioned an unknown number of jet articles was exhumed during the excavations made in the East Riding from 1849 to 1853 by the late Lord Londesborough, and by the late James Silburn, of Pocklington. These probably number a dozen or so.

In addition to the jet objects, the late Lord Londesborough in 1851 found in a stone cist at Kelleythorpe, near Driffield, accompanying a body, three amber buttons, a drinking cup, a bronze dagger, part of the head of a hawk, and a stone wrist-guard to which were attached four bronze rivets with gold heads. This is the only instance I remember of gold having been found with interments of the Bronze Age in East Yorkshire.

The records of amber buttons or ornaments of the Bronze Period have been nothing like so frequent as those of jet. As far as I know the three amber buttons found near Driffield, a piece of amber found by the late James Silburn in a barrow on Huggate Pasture,* and an amber button which I found with a body on Acklam Wold are all that have been obtained belonging to this early period in East Yorkshire.

A large amber ring was found with an interment at Arras, near Market Weighton, by the late Rev. W. Stillingfleet, in 1818, but being accompanied with iron articles it would belong to a much later period (the Early Iron Age). Still later—during Anglo-Saxon times—amber was largely used in the construction of necklaces, while the use of jet seems to have been almost wholly discontinued.

Taking together the authentic instances mentioned, there have been no fewer than 77 jet articles found with Early British interments in the East Riding, and I do not think that any other part of England of the same area has produced so many. Of this number 37 are in my collection, and the remaining 40 have been dispersed, never, I fear, to return to this district. It is probable that a few other jet objects belonging to the Bronze Period may have been found in East Yorkshire of which I am unaware.

* *Crania Britannica*, page 82.

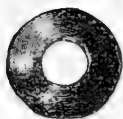


Fig. 6.—Jet Bead
from Langton
Wold.



Fig. 8.—Flat Jet Bead from
Helperthorpe.

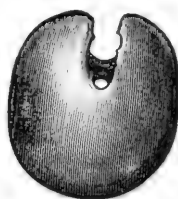
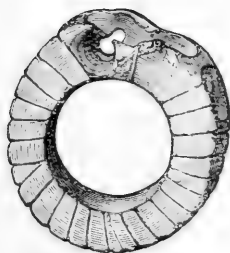


Fig 7.—'Fastener' (?) of
Jet from Rudstone.



Figs. 9-10.—Jet Rings from Rudstone.

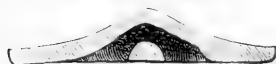
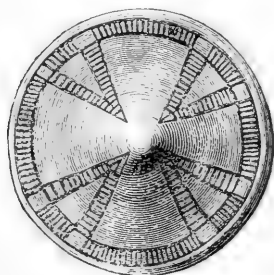


Fig. 11.—Jet Button from Rudstone.



Fig. 12.—Jet Beads from Egton.

From whence were these jet buttons and ornaments obtained? And where were they manufactured? Have they been imported or are they of local production?

Judging from my specimens I am inclined to believe that they have been obtained through both sources. Some of the pendants are merely rough pieces of jet, pierced from opposite sides in a manner which might have been readily accomplished with a pointed flint. Though most of the buttons have well-polished conical fronts, the piercings at their backs are such as would not be difficult to make with a pointed stone or even bone. In many instances also the flat backs of these buttons have evidently been cut and scraped with an instrument no better than a flint knife; and there are other articles which have probably been shaped by the same crude tools.

But on examining some of the better executed ornaments it seems clear that the work could not have been produced by stone or bone tools alone; such, for instance, as the boring of the broad flat beads, the drum-shaped and long cylindrical beads that chiefly compose many necklaces, and must have been pierced with small metal drills finely tempered.

There are also the very delicately-cut and pierced discs of jet, measuring as little as $\frac{1}{4}$ of an inch to $\frac{1}{2}$ an inch in diameter, and often but $\frac{1}{16}$ of an inch in thickness, of which some of the jet necklaces are mostly composed (see Fig. 1). I am of opinion that these could only have been produced by an exceedingly fine-toothed saw of metal, as they appear to have been so truly cut. As the borings in the long beads are mostly from opposite ends, meeting half way, some of them may have been made with the bronze drill-shaped awls (used as bow drills) possessed by the Britons. Such objects, generally named awls and prickers, are not infrequently found with British interments. No remains of a bronze saw has, as far as I know, ever been found with a British interment in East Yorkshire, or even in the British Isles. Nevertheless, such a tool may have been used by them, as I possess the root end of a oak sapling, about $2\frac{1}{2}$ inches in thickness, showing on its lower end several fairly clean cuts which must have been made by a metal axe; while some 6 to 8 inches from its thick end is a cross incision half through the piece of oak. When first found this cut was well-defined and showed that it had been made by a saw about $\frac{1}{8}$ of an inch wide. This must have been of the Bronze Age, as the piece of wood was taken with many others, much decayed, from under the centre of a very large British barrow not later than the

Bronze Age, on Rigg's farm, near Thixendale. These pieces had formed part of a dwelling, made apparently of wattle work, plastered with clay.*

Reasoning from the variable and wide range of skill displayed in the manufacture of these jet articles it may be safely inferred that many of those most rudely made are of British workmanship, the jet having for the most part been locally obtained. Some of it may probably have been obtained direct from the cliff sections in the neighbourhood of Whitby, whilst some may have been picked from the beds of drift. On the other hand, I think it highly probable that the more skilfully-made articles are of foreign origin, having been imported from countries more advanced in metallurgy and the arts generally.

To-day foreign jet almost entirely supersedes the English article, and it is highly probable that in the Bronze Age it was imported into this country in the form of manufactured articles. It is also very likely that our earliest bronze tools and weapons were similarly obtained from a foreign source. There were commercial interchanges with this island at a very early period; and, as always in commercial dealings with uncivilised tribes, beads and other attractive ornaments would be much in request, jet and amber being among the most valued.

Dr. Thurnam† says 'By the ancients jet and amber were not only sought after for ornaments, but found a place among drugs and amulets. They were believed to exert a wonderful power over the brain, nerves, and uterine system, and were believed to afford a test of female chastity.' It is possible that a belief of this kind may have been held by the East Yorkshire Britons. The virtue of jet as a charm seems to have survived into Romano-British times, but during the later Anglo-Saxon period amber appears to have superseded jet, judging from the frequent presence of the former and the almost entire absence of the latter in the graves of this period in East Yorkshire.

For the loan of the blocks of East Yorkshire jet ornaments, accompanying these notes, I am indebted to the Clarendon Press, Rev. Canon Greenwell, F.R.S., Sir John Evans, K.C.B., F.R.S., and the Archæological Institute.

* Presumably one of the occupants of this dwelling had been buried outside the entrance of the hut, which had subsequently been pulled down and a large mound raised over the débris.

† *Archæologia*, Vol. XLIII.

SOME POINTS IN THE BIOLOGY OF HEPATICÆ.

F. CAVERS, B.Sc.,
Yorkshire College, Leeds.

(Continued from 'The Naturalist,' May 1903, p. 176.)

Marchantia and *Lunularia* grow chiefly in open but moist situations, where there is little danger of complete drying up. They have large air-chambers with wide pores, the epidermis contains chlorophyll, and the ventral scales and root-hairs are well developed. In these forms, as in *Fegatella*, the thallus is not adapted to withstand desiccation; if left dry for a few days the plants wither and die. The structure of the thallus varies considerably with varying conditions of the environment as to light and moisture. The influence of light on the thallus-structure was pointed out by Stahl, and may be readily observed if young plants are raised from gemmæ, some being set in direct sunlight, others in more or less deeply-shaded places. The plants that receive the greatest amount of light show the thickest thallus, the air-chambers being well developed and containing numerous branched green filaments, and the epidermis being thick and nearly colourless. In plants exposed to diffuse light the thallus is thinner, the chambers shallower, and the epidermis having abundant chlorophyll. Finally, young plants kept in deep shade show no air-chambers or very shallow ones, and the thallus is green throughout. Observations in the field give analogous results, though the differences between the shaded and the exposed plants are not so sharply marked as in the cultures of gemmæ. Sometimes in examining patches of *Marchantia*, *Lunularia*, and *Fegatella* which are growing beside streams, we find parts of a patch becoming submerged in the water. These submerged parts are long and narrow, the scales and root-hairs are poorly developed, and the air-chambers show a gradual reduction in size and often disappear altogether. This leads us to the consideration of two rare British forms which occur in very moist and deeply-shaded situations, namely, *Dumortiera irrigua* and *Cyathodium cavernarum*. In the former air-chambers are absent from the older parts of the thallus; chambers are laid down as usual at the growing-point, but they later become disorganised. In exotic species of *Dumortiera* no traces of chambers can be detected at all, but in *D. hirsuta* the epidermal cells grow out to form short green filaments. In

Naturalist,

Cyathodium the thallus has a very simple structure, consisting only of two horizontal layers of cells, united by vertical plates which form the partitions between the large air-chambers; each chamber opens by a single wide pore in the roofing layer, whilst the lower layer of cells bears a few smooth-walled root-hairs. In both *Dumortiera* and *Cyathodium* the ventral scales are greatly reduced, each scale consisting of a simple or branched row of cells.

On the other hand, the genera *Targionia*, *Preissia*, and *Reboulia*, each represented in Britain by a single species, are chiefly found in exposed situations, where the plants are liable to become dried up at times. In these forms the thallus is capable of resisting the effects of continued drought, often becoming rolled up in the same way as *Riccia nigrella*, and reviving when water is again supplied. The ventral scales are large and deeply coloured, usually extending on to the lower surface of the lateral wings or even reaching the margins of the thallus. In *Targionia* and *Preissia* the chambers are relatively narrow and deep, the epidermis consists of large cells which contain little or no chlorophyll, the green filaments are well developed, and the pores are small. In *Targionia* each of the green filaments in the central portion of the chamber ends in a large globular cell containing very few chloroplasts; these swollen, colourless cells doubtless serve to screen the underlying

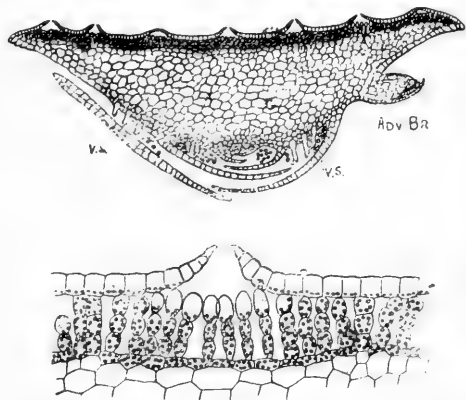


Fig. 7.—*Targionia hypophylla*. The upper figure represents a transverse section of the thallus, $\times 30$; the lower a single air-chamber, $\times 180$. V. S., ventral scales; adv. br., an adventitious branch.

ing green cells from excessive light (Fig. 7). In *Preissia** the compact tissue of the midrib is traversed by numerous very long and narrow fibrous cells, having thick brown-coloured walls

* Fruiting specimens of *Preissia commutata* and other interesting Hepaticæ, collected in various Yorkshire localities, were generously presented to the writer by Mr. W. Ingham, B.A., York. The writer has collected large quantities of *Reboulia hemispherica* on Malham Moor, near Skipton.

(Figs. 8, 9). In *Reboulia* the development of the air-chambers begins in the usual manner, but the primary chambers rapidly grow in size and become partitioned up by thin plates, so that in vertical sections the thallus is seen to be largely made up of a network of chambers, recalling the structure of *Ricciocarpus natans* (Figs. 10, 11). In the midrib there is a fairly thick zone of compact colourless tissue below the spongy green tissue, but in the thin wing on either side, the compact tissue is reduced to two or three layers of cells or even to a single layer. The large cells of the epidermis are colourless and their outer and vertical walls are strongly thickened, especially at the angles between adjacent cells. It will be seen that *Reboulia* differs considerably in structure from the remaining British Marchantiales, from which it is therefore readily distinguished when sections of the thallus are examined. The same type of structure is found in several other genera which together form a well-marked group, the 'Operculatæ' of Leitgeb (e.g., *Plagiochasma*, *Grimaldia*, *Fimbriaria*). All of these forms are, like *Reboulia hemispherica*, typically found in elevated regions, especially on limestone

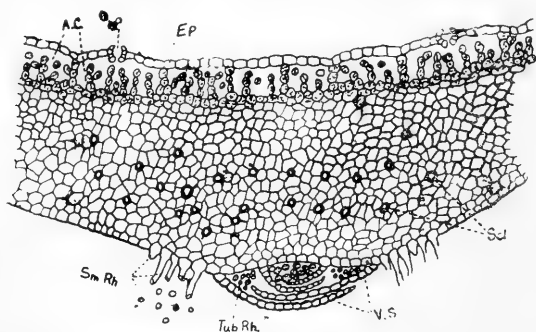


Fig. 8.—*Preissia commutata*. Part of a transverse section of the thallus. A. C., air-chamber; P., a pore; Ep., epidermis; Sm. rh., smooth-walled root-hairs; tub. rh., tuberculate root-hairs; V. S., ventral scales; Scl., sclerotic fibres of the midrib. $\times 40$.

rocks, and are adapted to endure periodical drying-up, to which they are exposed in nature. In most of these forms, as also in *Targionia*, the thallus becomes rolled up when dry, so that the dorsal green tissue comes

to occupy the interior of a tube, whose outer surface is formed by the lower side of the thallus, bearing the broad purple scales. In this condition the thallus retains its vitality during long periods of drought, and on being moistened becomes unrolled and resumes its ordinary mode of life. From Mattiolo's interesting observations and experiments on *Grimaldia dichotoma* it appears that the rolling-up of the thallus depends on the fact that the cell-walls in the ventral compact tissue are largely

mucilaginous, so that on losing water they become shrunk, and on being again moistened return to their original condition. Mattiolo found that when plants of *Grimaldia* were cultivated in a moist chamber, they ultimately lost the property of resisting desiccation, the ventral scales formed on the new branches being smaller and remaining green. Exactly similar results have been observed by the present writer in the case of *Reboulia*. The chief biological features of the xerophytic Marchantiales may be thus summarised: (1) the sharply-marked epidermis, the cells of which contain little or no chlorophyll and have thickened walls; (2) the relatively narrow and deep air-chambers, with small pores; (3) the well-developed compact ventral tissue, adapted for the storage of water and reserve food-materials and for causing the rolling-up of the thallus; (4) the large and deeply-coloured ventral scales, adapted for holding water by capillarity and for protecting the growing-point, in addition to covering the rolled-up thallus; (5) the well-developed tuberculate root-hairs. In *Preissia*, as noted by Gœbel, the lowest ring of cells surrounding the 'barrel-shaped' pore is capable of being narrowed so as to close the pore, these cells acting in the same manner as the 'guard-cells' in

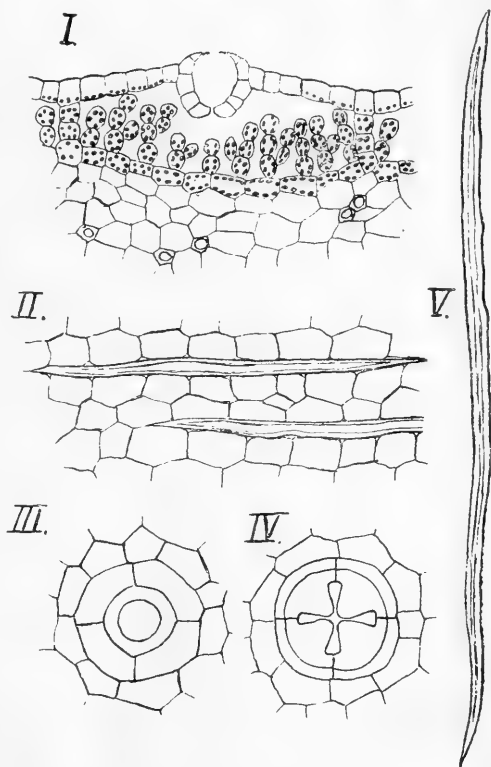


Fig. 9.—*Preissia commutata*. I., Shows a single air-chamber in vertical section, with its 'barrel-shaped' pore and branched green filaments; II., part of a longitudinal section through the midrib, with portions of two fibres; III., IV., a pore in surface view (III., showing the upper ring of cells; IV., the lowest ring); V., an isolated sclerotic fibre. All \times about 100.

the stomates of higher plants. Of the British Marchantiales, *Targionia hypophylla* is the most markedly xerophytic, the faculty of resisting drought being more highly developed in this form than in *Preissia* and *Reboulia*, which, though showing certain adaptations for a xerophytic habitat, are intermediate in this respect between the thoroughly xerophytic *Targionia* and the forms which are in nature seldom exposed to the risk of desiccation, e.g., *Marchantia*.

Out of about 230 species of Hepaticæ occurring in Britain 18 belong to the Marchantiales, 16 to the thalloid Jungermanniales, and the remainder, nearly 200, to the foliose Jungermanniales. When we take into account the Hepaticæ of the whole world, the disproportion between the thalloid and the foliose forms becomes even more striking, for of about 4,500 species only

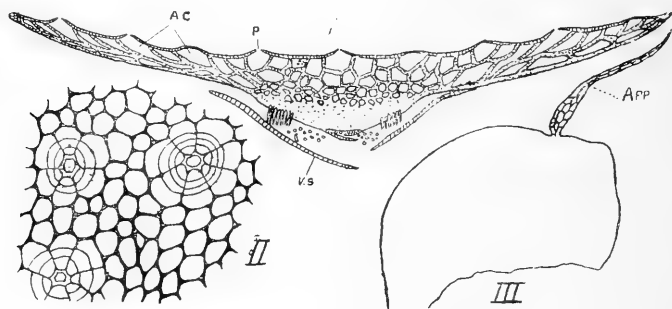


Fig. 10.—*Reboulia hemispherica*. I., The whole thallus in transverse section, $\times 15$; II., part of the epidermis as seen from above, showing three pores, $\times 40$; III., a ventral scale, with a single pointed appendage (app.), $\times 40$.

about 500 are thalloid, the remaining species all belonging to the foliose Jungermanniales. The single genus *Plagiochila* contains more species than the whole of the thalloid genera together, whilst *Frullania* comes second with over 300 species. The foliose Jungermanniales show endless variety in the modification of the leaves. In most cases these are flattened, either consisting of a single rounded lobe (e.g., *Nardia*), or deeply divided into two lobes which may be either about equal in size (e.g., *Cephalozia*) or markedly unequal; in the latter case the upper lobe is usually larger than the lower, but the reverse holds good in some forms (e.g., *Scapania*). The margin of the leaf is often fringed with fine outgrowths (e.g., *Ptilidium ciliare*), or the leaf may be cut into numerous lobes (e.g., species of *Lepidozia*); from these forms there are various transitional stages to those

in which the whole leaf is made up of numerous fine filaments (e.g., *Blepharostoma*, *Trichocolea*), or is reduced to two or three such filaments (e.g., *Arachniopsis*). Amongst many curious forms met with in exotic Hepaticæ* there may be mentioned *Micropterygium*, in which each leaf bears a wing or keel similar to that of the moss-genus *Fissidens*; *Schistochila*, in which the leaf is usually provided with several wings of this kind; *Stephaniella*, in which the leaf bears numerous green filaments which cover its entire upper surface. In a few forms there is a rudimentary midrib consisting of several rows of elongated cells (e.g., *Diplophyllum albicans*, *Herberta*) or of a single row of large colourless cells (e.g., *Frullania tamarisci*, *Neurolejeunea*);

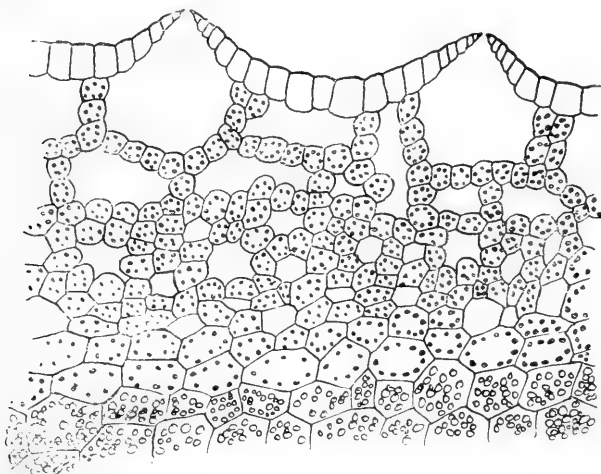


Fig. 11.—*Reboulia hemispherica*. Part of a transverse section of the thallus, showing the upper spongy tissue with two pores, and portion of the lower compact tissue with starch-containing cells. $\times 150$.

but in practically all cases the leaf consists throughout of a single layer of cells, though in a few species it is in part several cells thick (e.g., *Schistochila pachyphylla*). The division of the leaf into lobes or filaments and the production of filamentous or flattened outgrowths from its surface may be regarded as simple adaptations for retaining moisture, but in many species we find more elaborate modifications to serve the same function. Most of the species in question live as epiphytes on the bark of trees, or, in many exotic forms, cover the leaves of trees with a dense

* The writer's best thanks are due to Mr. Matthew B. Slater, F.L.S., for many fine specimens of tropical Hepaticæ.

matting, sometimes hanging downwards as festoons. In these forms either the whole leaf or a part of it is converted into a sac or pitcher in which water is stored. This may be effected by the whole leaf becoming folded longitudinally, so as to resemble the valves of a mussel-shell (e.g., *Mytilopsis*), or becoming dilated at the base (e.g., *Nowellia curvifolia*); or the lower lobe of the leaf is sharply bent on the upper (e.g., *Scapania*, *Radula*, *Porella*, most *Lejeuneæ*). In *Frullania* and *Pleurozia* the lower lobe of the leaf is modified to form a hemispherical or cylindrical sac (Fig. 12); in *Lepidolæna* sacs of this kind are borne both on the lateral and the ventral leaves (amphigastria), and in *Colurolejeunea* the whole leaf is converted into a pitcher. In *Pleurozia* and *Colurolejeunea* the opening into the cavity of the sac is guarded by a valve which readily opens inwards but not outwards, and as the remains of small animals (rotifers, crustacea, insect-larvæ) are sometimes found in the pitchers, it has been suggested that these liverworts resemble in miniature the well-known insectivorous 'pitcher-plants.' In many of the leafy Jungermanniales the rhizoids are found to be traversed

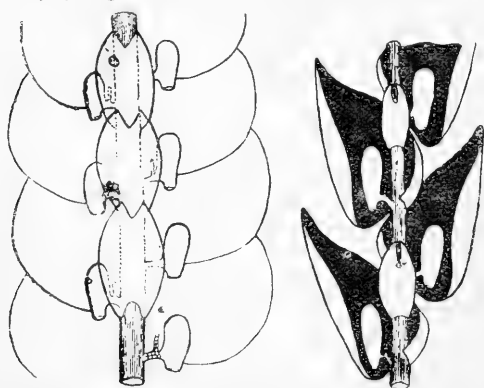


Fig. 12.—Two species of *Frullania*; ventral views showing the three rows of leaves, the lateral ones bearing pitchers.
× 40.

by fungal hyphæ, which pass into the lower cells of the stem, forming a mycorrhiza comparable with that found in various thalloid *Hepaticæ* (e.g., *Fegatella*, *Preissia*).

An interesting but somewhat obscure feature in the biology of the *Hepaticæ* is the presence of *Nostoc*-

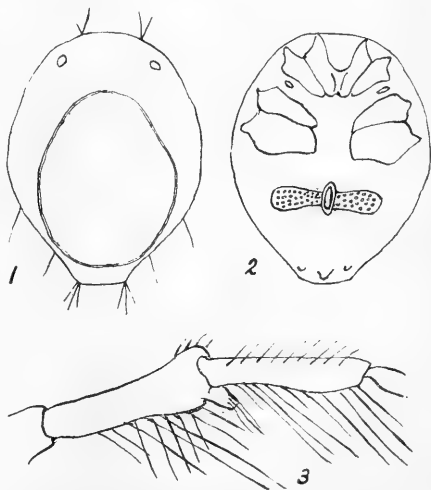
colonies in their tissues. Chains of this blue-green Alga are frequently observed in the cells of the compact ventral tissue of the *Marchantiales*, whilst in *Blasia* and the *Anthocerotæ* they are found inhabiting special organs. In *Blasia* these organs have the form of hollow spherical outgrowths from the lower surface of the broad stem, two of these 'auricles' usually occurring at the base of each leaf; in the *Anthocerotæ* the *Nostoc*-colonies are contained within special chambers in the tissue of the host-

plant, each chamber at first opening by a small pore, but later becoming closed. Whether or not this association of *Nostoc* with the liverwort can be regarded as a case of symbiosis, there seems to be little doubt that a relationship of this kind exists in those Hepaticæ whose tissues contain a mycorrhiza-like zone of cells containing the hyphæ of a fungus.

NEW BRITISH WATER MITES.

C. F. GEORGE, M.R.C.S.,
Kirton-in-Lindsey, Lincolnshire.

***Arrhenurus pyriformis* n.sp.** This very singular-looking mite was found at Manton, near Kirton-in-Lindsey, 20th August 1902. It differs greatly in general contour from any other male *Arrhenurus* I have yet seen; indeed at first sight it looks more like a female than a male, differing, however, in having the anterior wider than the posterior, whilst in oval females the posterior is widest and roundest; besides this, the presence of the conspicuous process, or spur, on the fourth joint of the last leg, which is only found in the male sex of *Arrhenurus*, at once settles the question. In colour it much resembles the female *A. caudatus*, being blue, with an oval portion on the anterior part of the dorsum, reddish brown, and more diaphanous than the rest part of the chitinous skin of the body. One remarkable circumstance not common in the male *Arrhenurus* is the fact that the depressed oval line on the back is complete posteriorly as well as in front. The perforated plates on each side of the genital opening are well shown in Mr. Soar's figure. The female is at present unknown.

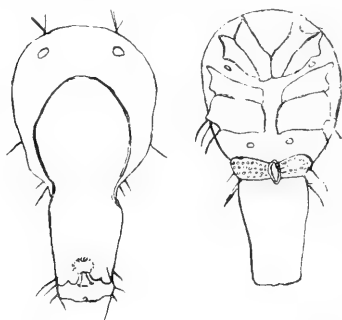


***Arrhenurus pyriformis* n.sp.** (1) Dorsal, (2) ventral surface of male, (3) last leg showing spur on fourth joint.

Fig. 1 is the dorsal surface; Fig. 2 is the ventral surface; Fig. 3, the fourth and fifth joints of the last leg, highly magnified, to show the process or spur.

Mr. Soar gives the following measurements:—Length of body, 1·28 mm.; breadth of body, 0·98 mm.; length of first leg, 0·80 mm.; second leg, 0·96 mm.; third leg, 1·044 mm.; fourth leg, 1·28 mm.

Arrhenurus mantonensis n.sp. This mite was taken in August 1902 in the parish of Manton, near Kirton-in-Lindsey. It belongs to Piersig's first division of this family, viz., with a more or less cylindrical tail. The general colour of the body is reddish-brown, the tail part yellowish, the Y-shaped mark a



Arrhenurus mantonensis n.sp.

pale yellowish-red. The epimera are bluish and the legs green; the eyes crimson. The part distinguishing this mite from others of this division is the end of the tail; examining the mite on its dorsal aspect this part will be seen to be sloped off rather suddenly from above, the end of the tail being nearly square; in the centre instead of a deep notch is a small spot or papilla; the outer corners of the tail are nearly square, only slightly rounded; just above the slope are some chitinous portions, arranged in a pyramidal form, and anterior to these is a rounded mound or projection, somewhat nipple like. The palpi and legs are of the normal type, the fourth joint of the last legs are provided with a rather large spur of the usual kind.

Mr. Soar, who as usual supplied me with the figures, gives the following measurements:—Body length, 1·47 mm.; breadth, 0·72 mm.; length of first leg, 0·12 mm.; second leg, 1·12 mm.; third leg, 1·20 mm.; fourth leg, 1·44 mm.

BIRDS.

Little Stint in Durham.—A specimen of the Little Stint (*Tringa minuta*) was shot on the Wear at Sunderland on 15th December 1902.—J. W. FAWCETT, Satley, Darlington, 1st April 1903.





A. H. Haworth

HULL'S CONTRIBUTION TO SCIENCE.

THOMAS SHEPPARD, F.G.S.,

*Secretary of the Yorkshire Naturalists' Union; Curator of the
Municipal Museum, Hull.*

HAVING regard to the size of the third port and the important part it has played in the history of the country, Hull's contribution to science on the whole cannot be looked upon as a large one. Moreover, what has been accomplished is but little known to-day, and the following notes are written with the object of placing upon record particulars of the work of some of Hull's scientific worthies.

With the exception of the last few years, the past quarter of a century has witnessed a very sad state of things so far as Hull's scientific attainments are concerned. During that period almost all that was ever accomplished has been forgotten, and of our former workers in the paths of science it truly might be said that 'the good is oft interred with their bones.'

As in every other walk of life, the progress of science, great and recognised as its advantages are, has its disadvantages. The continual studies of a whole army of workers has resulted in almost every possible branch of science being thoroughly pursued; new studies have sprung up in every direction in alarming numbers; students are following their vocations in continually narrowing grooves, and the 'specialist' has been created or evolved. The effect of all this is that it is impossible for any human being to have even an elementary knowledge of everything. In former years it was no rare event for an educated man to be fairly conversant with all the then known sciences: to-day this is utterly impossible. Our life is much too short. The average scientific man must now know 'something of everything and everything of something,' or as near 'everything of something' as he can get.

Many illustrations of what has been accomplished in the matter of the specialisation of research could be given from the records of various societies.*

The scientific societies formerly existing in Hull have died a natural death, or have so altered their *modus operandi* as to be hardly recognised, except in name. New societies have been

* Excellent examples are quoted by Sir Michael Foster in the 'Naturalist' for 1899, pp. 210-211.

formed, which to a certain degree are carrying on the work formerly done by their predecessors. The various and numerous institutions, ranging from the Literary and Philosophical Society to the smallest guild or mutual improvement society connected with a church or chapel, have resulted in the interest being squandered. Photography and the magic lantern are in part responsible for this. The reading and discussion of strictly scientific papers before large audiences is now almost a thing of the past. The 'popular lantern lecture' is far more acceptable, and if the membership of the societies is to be kept up, the demands of the members in this respect must be catered for. The Hull Literary and Philosophical Society (now, I regret to say, a *Literary and Philosophical Society* by name only) is by no means alone, but has shared the inevitable fate of similar societies in almost every provincial town in the country. Its very existence to-day is due to the fact that its officers have decided to alter the nature of its proceedings to meet the times. Had its original plan been adhered to, the income would certainly not have met the expenditure, and it would have had to be numbered with many other once useful societies, now no more. The formation of numerous societies dealing with special subjects has also greatly interfered with the centralisation of scientific thought. Particular reference is made to the Literary and Philosophical Society because it is the only local one that can look back for any great length of time, and because its career is so very characteristic of the times, and the rise and fall of its science department chronicles the state of scientific activity in the town during the last eighty years.

In October, 1822, just over eighty years ago, a few gentlemen met at the Dog and Duck Tavern, primarily to discuss the advisability of purchasing a collection of curiosities from Mr. W. W. Hyde, in order to form a museum for the town. At the same time the necessity for some scientific institution was felt, and it is found that on the proposition of Mr. W. H. Dykes, seconded by Mr. Fielding, the following resolution was unanimously passed:—'That an Institution be formed at Hull for the general promotion of Literature and Science.' On the same date as the above-mentioned meeting, the collection of curios was examined and purchased for £80. On November 6th the 'Code of Laws of the Hull Literary and Philosophical Society' was adopted, and by January 1st, 1823, the society had paid £15 in advance for the use of two rooms above the news-room of the Exchange. By July the President (Dr. J. Alderson) had delivered an address, which was printed, and a further collection of fossils, shells, birds, etc., had been secured

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for £100. Amongst the first list of honorary members of the Society occur the names of W. Spence, A. H. Haworth, P. W. Watson, and the Rev. J. B. Emmett—some of the foremost of Hull's scientific worthies. The first paper read and discussed by the members was 'On the Geology of the Neighbouring District,' a significant title and an appropriate subject, and no doubt one of the main reasons of the early success of this Society, as a scientific body, was to a large extent due to the *local* flavour of its addresses and discussions.

The following interesting entries occur within the first year's report:—'Mr. John Murray, F.S.A., F.L.S., etc., well known as an able lecturer on various branches of science, being at that time (January 1824) in Hull, the Council engaged him . . . to deliver a course of twelve lectures on chemistry, for the sum of £42. These lectures were given in the Exchange and proved highly advantageous to the Society, as the expenses exceeded the receipts by only £6 7s. 9d., for which sum all the members of the Society had free admission to them; besides which they were the means of adding considerably to the number of the members on account of the privilege just mentioned.'

Again, 'Mr. Smith, the well-known laborious author of the geological maps of England and Yorkshire, and his nephew, Mr. J. Phillips, being in this county in November, the Council eagerly embraced the opportunity of engaging these gentlemen to deliver a course of nine lectures on the interesting study of geology, for the sum of £50, which were given at the Assembly Rooms in the month of December, and illustrated by numerous drawings and specimens, in which the Society's museum was again found to be exceedingly useful; and it must be satisfactory to the members to learn that it was pronounced by those competent judges to contain a highly valuable set of specimens. The [net] cost to the Society of these lectures was only £12 9s., and they were accompanied by an accession to the list of members fully counterbalancing that sum, so as, in point of fact, to have been enjoyed by the Society gratis.' After this Phillips frequently lectured in Hull, and also arranged the geological collections in the museum and added specimens to the cases.

This was in Phillips' young days, even before he was appointed to the curatorship of the museum at York, and the Hull Society had every reason to be proud of securing the services of the man who eventually proved to be one of Yorkshire's most brilliant geologists, as well as those of his uncle, William Smith, the father of English geology. As a memento of their visit, however, the Hull Museum possesses some of the

identical specimens presented by Smith and Phillips, and, more important and valuable still, several of Smith's original hand-coloured geological sections, published in 1819, which have now been framed and receive a deservedly prominent position in the new geological gallery. That these were found but a few months ago in a cellar under the Museum, discarded and dirty, is but one other piece of evidence of the change that latterly has taken place in Hull's appreciation of science.

To return to the Lit. and Phil. : the rooms in the Exchange were soon inadequate for the collections and meetings, and in 1831 the Society removed to the building now known as the Assembly Rooms, in Jarratt Street, part of which had been specially constructed for its convenience. 'The Hull Literary and Philosophical Miscellany' was published by the Society in October 1844, and continued to appear for a few months. It contained papers, etc., read at its meetings. In June 1855 the collections were removed to their present home in the Royal Institution, Albion Street. This was opened by the late Prince Consort in 1854, and cost about £7,000, Charles Frost, F.S.A., a thoroughly scientific man, then being the president.

From that time the desire, or necessity, for a large income slowly but surely affected the nature of its meetings and the quality of its work. The popular lecture made its appearance. Huxley, Thackeray, and many other scientific and literary leaders were induced to visit the town. The difference between these and the local 'lights' must have been most marked; the desire for first-rate lectures increased, the available funds at the disposal of the Society were more and more encroached upon for lecturers' fees, to the neglect of other matters. Competition with the somewhat similar institutions in the town aided in the general destruction of the 'philosophical' element, and assisted in the growth of the entertaining lantern lectures by more or less eminent men, including even the nobility. To-day the principal work of the officers of the Society, besides attention to a certain social element, is the preparation of an attractive syllabus, which necessitates a very large expenditure. Classes in chemistry and other subjects were held later in the Society's rooms, and under its auspices, but these were gradually discarded, their places being taken by the School Board and other classes; and even its Museum, valuable as some of its contents were, became a source of anxiety to the members, and was eventually handed over to the town on certain conditions in January 1901.

(To be continued.)

REVIEWS AND BOOK NOTICES.

Geographical Distribution of Vegetation in Yorkshire, by **Dr. W. G. Smith**, Yorkshire College, Leeds, and **C. E. Moss**: Part I (from the 'Geographical Journal,' April 1903), 27 pages, 8vo., with a map and 9 photographs.

This is an eminently suggestive paper, which should be studied carefully by all who are interested in local botany, and especially by those who are likely to write upon the subject. The map relates to the southern half of the West Riding of Yorkshire and shows, by means of different colours and mark-



Walshaw Dean. Grass heath in the moorland valley of a stream. Cotton-grass moors on distant heights.

ings, how the different classes of plant-station are distributed through the district. They are divided primarily into four groups, viz., (1) Moorland, (2) Transition Moorland, (3) Woodland, and (4) Farmland. Each of these is subdivided into three, four, or five subordinate classes. In the present area farmland with wheat, and farmland without wheat, together take up three-fourths of the whole space. In the southern half of the West Riding cultivation does not reach nearly so high as it does in the limestone regions of North Yorkshire and South

Durham, where cabbages, potatoes, and turnips are grown up to 1,800 or 2,000 feet. The woodlands are scattered throughout the cultivated area, often in the form of parks, and are more massed on the hillsides. They are subdivided into three kinds, Scotch Pine or Larch, Oak, and Oak mixed with Beech. So far north the Beech cannot be regarded as a native, and, of course, the Coniferæ are also planted. The moorland occupies a comparatively small area towards the western boundary of the map, and is divided into three groups, according to whether Bilberry, Cotton-grass, or *Calluna* predominates. As most of the readers



Crimsworth Head. Edge of a Cotton-grass Moor, with dark patches of heather on the slopes and grasses near the stream.

of 'The Naturalist' will be aware, a committee has been appointed by the Yorkshire Naturalists' Union for the purpose of extending this kind of survey to other parts of the county. The northern half of the West Riding is finished, and the map, with its accompanying text, is expected to appear in the June number of the 'Journal of the Royal Geographical Society.' Of course in other parts of the county some other types of station will be represented. In the present area there is no sea-board, neither high cliff, sandhill, or marshy ground intersected by tidal ditches, and no high ground pastures with a thin layer

Naturalist.

of soil over limestone, such as carries the lowland pasture plants up to a great height, no chalk wolds and no cliffs of limestone or basalt. I shall be greatly interested in seeing the survey extended to the North Riding, with which I am personally most familiar. The highest point of the hills included in this map is 1,900 feet, so that no portion of the area reaches up into Watson's 'Arctic Region,' and the number of northern (Scottish and Highland types of Watson) that occur within its bounds is much smaller than in the northern tracts included within the county. The nine photographs, by Mr. W. B. Crump, M.A., of Halifax, show characteristic stations of different types, and in the text a list of the commonest and most characteristic plants of each type is given. This is the first area in England that has been dealt with in this comprehensive manner. Two tracts in Scotland, North Perthshire and the neighbourhood of Edinburgh, have been similarly dealt with by the late Mr. Robert Smith, whose death at an early age was a great loss to British botany. Similar surveys have been carried out by Professor Flahault, of Montpellier, in France, designed principally to show the distribution of certain trees; and a large number of photographs, similar to those of Mr. Crump, will be found in a book published in 1899 by Professor Conway Macmillan, entitled 'Plant-life in Minnesota.' In the list of books cited H. C. Watson's 'Cybele Britannica' is included, but not his more recent 'Topographical Botany,' in which Yorkshire is divided into five vice-counties, and a separate catalogue of plants given for each. It is now nearly forty years since I came away from Yorkshire, and it gives me great pleasure to see that a new generation of botanists has arisen who are doing such thorough and excellent work.

J. G. BAKER.

FIELD NOTES.

FISHES.

Pike at Hemphone Lock.—At Hemphone Lock, on the river Hull, there is a weir and the water from the clews rushes against a wall on the bank of the stream with great violence. At this point during March a Pike of 2 lbs. jumped clear of the water right on to the top of the wall, a perpendicular distance of two feet, and was easily captured. There was a similar occurrence a few years ago at the same place, the Pike in that instance weighing 9 lbs. It is not at all remarkable for members of the Salmon family to leap a considerable distance, but I have seldom known Pike leap as high as recorded above.—H. M. FOSTER, Hull, 9th May 1903.

NORTHERN NEWS.

A thrush's nest in a turnip top is recorded at Little Driffield; and in the same district a blackbird has brought off its brood in a cabbage.

The 32nd annual report of the Sheffield Naturalists' Club includes a record of *Eupithecia isogrammata*, an addition to the Yorkshire list of lepidoptera.

The 1902 report of the Moss Exchange Club, of which Mr. W. Ingham, B.A., is the Secretary, is to hand. The Club is evidently accomplishing good work in this branch of study.

In a paper on 'The Elk in the Thames Valley' (Quart. Journ. Geol. Soc., Feb. 1903, p. 80), Mr. E. T. Newton, F.R.S., refers to antlers of *Alces machlis* from Barmston and Carnaby Moor, in East Yorkshire.

We regret to record the death of Mr. James Bedford, of Leeds, and Mr. A. Millward, of Harrogate, both for many years members of the Yorkshire Naturalists' Union, which took place recently.

In the April Journal of the Quekett Club Mr. D. J. Scourfield gives a 'Synopsis of the known species of British Freshwater Entomostraca. Part 1. Cladocera,' in which several Lake District forms are enumerated.

The 1902 Annual Report of the Huddersfield Naturalist and Photographic Society shows that good work has been done during the year. Mr. C. Bulmer suggests that the geologists should devote their attention to the question of 'How the scenery of the Huddersfield District has been affected or modified by Geological Faults.' Botanical and ornithological notes are also given.

In the same report Mr. C. Mosley records the following local occurrences under the head of Lepidoptera. The Orange-tip Butterfly, Small Copper Butterfly, *Orgyia antiqua*, *Liparis auriflua*, *Hydracia petasites*, *Cucullia umbratica*, *Xanthia cerago*, *Amphydasis betularia* and var. *doubledayaria*, *Boarmia repandata* (a very dark specimen) and *Scotosia dubitata*.

We regret to learn that Mr. G. P. Bulman, of Newcastle, is dead. Notwithstanding his early age (26), he had accomplished much work amongst the marine mollusca of Northumberland, and had also carried out some interesting experiments relating to heredity.

The Milnsbridge Naturalists' Society had a Sunday meeting on April 26th, at which over 350 working men were present. The meeting was presided over by Mr. A. Townend, and Messrs. Goldthorp, Knutton, and Boothroyd, and others addressed the meeting.

Originating in a suggestion from the Bradford Botanical Society, the Bradford Corporation has recently opened a botanical garden in Lister Park, covering about two acres.

At the annual meeting of the Darlington Naturalists' Field Club, held towards the end of April, it was announced that the late Dr. Manson's books had been purchased for the society's library; also that a boulder of Shap granite, over nine feet long—the largest for the district—had been discovered on the Cliffe estate.

The Durham County Naturalists' Union, at present consisting of seven field clubs, with 134 members, held its quarterly meeting on Saturday, 4th April. A paper was read by the Secretary of the Union (Rev. W. J. Wingate) on 'County Organisation.' He suggested dividing the county into districts, each to be worked systematically by the members. It was decided to make a classified collection of card records, containing particulars of species, dates, localities, local observations on their habits, life-histories, and varieties. It was also decided to publish a County Naturalists' Record Book for distribution amongst the members, with a view to collecting material for a natural history survey of the county on the lines advocated by Dr. Wm. G. Smith in the January number of 'The Naturalist.' In this way work will be provided for the beginner, as well as for the advanced naturalist, and it is hoped the use of these record books will make the field days more profitable than they usually are.



S. S. Shadwick

NOTES AND COMMENTS.

IN MEMORY OF SAMUEL CHADWICK, F.G.S.

A once familiar figure at the excursions of the Yorkshire Naturalists' Union was Samuel Chadwick, F.G.S., of Malton, well known throughout East Yorkshire as an enthusiastic collector of fossils and antiquities. Situated in an exceptionally favourable area, he found plenty of work amongst the Cretaceous and Oolitic rocks, and secured quite a large number of valuable specimens, some of which proved to be new to science. He was essentially a *field* geologist, and rarely seemed so happy as when leading a party of fellow workers across the Wolds, from quarry to quarry, his tall figure being always in the van.

The specimens he collected were distributed to the York, Scarborough, and Whitby Museums, though his principal specimens are to be found in the Malton Museum, in connection with which he took a deep interest. Amongst the principal items in the latter collection are: a collection of sponges, etc., from the Chalk; a fine series of fish teeth, etc., from the Oolites near Malton, including some complete palates; several large Oolitic ammonites; a remarkably fine fin of *Asteracanthus ornatissimus*, and a set of Speeton clay fossils. He also placed many fine British flint and bronze implements in this Museum.

Amongst his more important discoveries was a series of fossil sponges from the Oolites at Settrington, Langton Wold, and Suffield, one of which was named after him. These were described by Dr. G. J. Hinde in the Palæontographical Society's Monograph for 1893 ('Sponges of the Jurassic Strata'). They are:—*Corynella chadwicki*, *C. langtonensis*, *Holcospongia polita*, and *Blastinia aspera*.

On the formation of the Yorkshire Boulder Committee, Chadwick took an interest in its work, and recorded many far-travelled erratics in East Yorkshire. He was secretary of the committee in 1890, and drew up its fourth report ('The Naturalist,' 1892, pp. 155-158). He occasionally contributed short notes to this journal, but was not a great writer.

Chadwick was one of the founders of the Malton Naturalists' Society, and was always one of its prominent workers. Bee culture was another of his hobbies, and with this he was particularly successful, and gave lectures on the subject under the auspices of the East Riding County Council. He was also a prominent Freemason.

He left Malton in 1895, with his wife and family, for New Zealand, to resume the occupation of sheep-farming, in which he had been engaged there as a young man in the early sixties. He apparently prospered well in New Zealand, until 18th March last, when he died suddenly, of heart disease, at the age of 58. The following extract from a recent New Zealand newspaper shows that he continued to do good work after leaving England :—

‘The mortal remains of the late Mr. S. Chadwick, J.P.; were interred in the Ormondville Cemetery on the 21st March, in the presence of a large concourse of people, who thus certified to the very high esteem in which deceased was held by his fellow-men. . . . He was the originator of the scheme for establishing the Waikopiro Institute and Library, of which he was president and trustee. In educational matters he was also to the fore, as through his indefatigable zeal the Education Board was induced to establish the Whitukura Public School, Mr. Chadwick holding the chairmanship of the committee. His energies were also moved in the direction of obtaining for the Waikopiro settlers good roads; and what great improvements have been made in that direction the settlers well know. . . . He was the right stamp of a settler, and his name will for ever be kept green in the annals of the history of Waikopiro.’

For much of the above facts the writer is indebted to Chadwick's life-long friend, Mr. M. B. Slater, F.L.S. T. S.

CAVE REMAINS IN DERBYSHIRE.

Professor W. Boyd Dawkins has just described* a collection of mammalian remains from a cavern near Doveholes, Derbyshire, which is of exceptional importance. The cave was first discovered in 1901, and was fully exposed in 1902, and consisted of a large chamber and a small passage, both being eroded in a master joint in the Carboniferous Limestone. The cave was filled with stratified yellowish red clay, mixed with pebbles of quartz, etc. Scattered here and there in the mass were mammalian bones and teeth, some worn and in the condition of pebbles, others unworn and with sharp fractures. These include bones of *Machairodus crenatidens*, *Hyaena*, *Mastodon arvernensis*, *Elephas meridionalis*, *Rhinoceros etruscus*, *Equus Stenonsis*, and *Cervus etueriarum* (?). The discovery has added one species (*Machairodus crenatidens*) to the Upper Pliocene

* Quart. Journ. Geol. Soc., No. 234, 1903.

fauna of Britain. 'It is the only Pliocene cave yet discovered in Europe, and is the only evidence as yet available of the existence of the Upper Pliocene bone-caves, which, from the nature of the case, must have been as abundant in Europe as those of the succeeding Pleistocene Age. From this point of view it affords a striking illustration of the fragmentary nature of the geological record, and of the general effect of denudation on the surface of the land.' The specimens are deposited in the Manchester Museum.

A NEW YORKSHIRE FOSSIL.

In the same journal Mr. A. C. Seward describes an addition to the Mesozoic flora under the above name. Amongst a collection of plants sent to the author by the Rev. J. Hawell, of Ingleby Greenhow, a few fragments of *Dictyozamites* were detected. They were collected from a bed of ironstone on the northern face of the Upleatham outlier, near Marske-by-the-Sea, Yorkshire. The plant-bed from which the remains were found is low down in the Estuarine Series, and is probably of Lower Estuarine Age. The remains proved to represent a new species, and were named after their discoverer. The find is of particular interest also as it proves the occurrence in the Jurassic plant-beds of Yorkshire of a genus previously supposed to be confined to Japan, India, and Bornholm. The specimens are to be deposited in the British Museum.

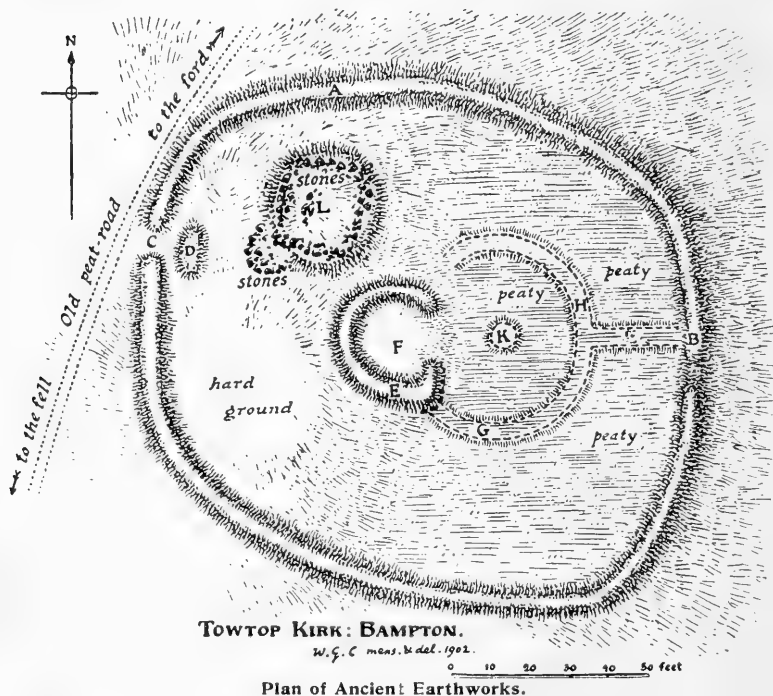
THE YORKSHIRE CHALK.

A paper of great interest to Yorkshire geologists was recently read before the Geologists' Association of London by Dr. A. W. Rowe, of Margate. The author dealt with what he called the white chalk of Flamborough Head—that is to say, with all the chalk above the *Belemnitella plena* marls exposed on the coast between Speeton and Bridlington. He spoke of the special difficulties presented by the chalk of Yorkshire to field-workers, such as its extreme hardness, the scarcity and poorness of its fossils, and the inaccessibility of some of the most important sections. But the chief interest of the paper consisted in the attempt to show that the mass of Yorkshire chalk is divisible, by means of its contained organic remains, into definite beds or zones, similar to those previously worked out by the author in the Upper Cretaceous rocks of Kent, Dorset, and Devon. The lecture was illustrated by photo-lantern slides, and by a model of the district on a scale of six inches to the mile and one inch to 100 feet, which had been specially constructed by Mr. C. Davies Sherborn. This model, it was

announced, would be presented to the Hull Museum, in recognition of the friendly assistance given by the members of the Hull Geological Society to Dr. Rowe and Mr. Sherborn when in Yorkshire.

ANCIENT EARTHWORKS.

There are many interesting earthworks distributed up and down the country which it would be well to have thoroughly explored before they are for ever defaced by agricultural or other operations. Carefully-prepared drawings and descriptions are consequently always welcome. A very interesting type of



earthwork, probably British, shown in the accompanying plan, has just been described by Miss Noble.* This is known as Towtop Kirk, and is situated at Bampton, Penrith. The earthwork is an irregular circle, about 150 feet in diameter, and encloses 'hut circles,' etc. During 1902 a detailed examination of this site was made under the direction of Mr. W. G. Collingwood, full particulars of which are given by Miss Noble in her interesting paper.

*Trans. Cumb. and Westmorland Antiq. and Arch. Soc., 1903, p. 265.

THE CHEMISTRY OF SOME COMMON PLANTS.

P. Q. KEEGAN, LL.D.,

Patterdale, Westmorland.

Club Moss. *Lycopodium selago.* This is a plant of the hills never seen till you ascend some 1,000 feet or so. There scattered on the parched surface, or hanging festoon-like from the clefts of the wild weather-worn rocks which jut sharply from or crown the highest ridge of mountain ground, you observe its clustered tufts of bristly rods. Its habitat is eminently non-moist and gritty and nearly barren, although it manages to carry about an equal weight of water. About the beginning of July the plant is in a pretty fresh condition, and its chemistry is then, so to speak, in an embryonic condition or stage. The products of assimilation predominate. Nevertheless, there is about 3 per cent. in dry of wax with some cholesterin, and a considerable admixture of carotin, but no resin or glyceride. The alcoholic extract (after benzene) consists of a pasty mass which encloses no tannin or phloroglucin, etc., and mere traces of rutin, but yields distinctive reactions of a glucosidal bitter principle of no very decisive or well-defined character. The aqueous extracts of the plant are specially rich in albumenoids, mucilage, sugars, pentosans, and a curious admixture of starch and amylo-dextrin. The ash amounts to about 1.6 per cent. in fresh, and contains 62.4 per cent. soluble salts, 10.9 sand and silica, 1.5 lime, 5 oxides of iron and alumina, 2.6 phosphorus, and 2.7 sulphur. The well-known spores contain 47 per cent. fat-oil (composed of glycerides, free fat acids, and phytosterin), also wax, 3 sugar, 1.5 mucilage, and a peculiar nitrogenous principle called pollenine, and their familiar combustibility (theatrical lightning) seems to depend on the peculiar configuration as well as upon the highly oxidisable character of the constituents.

Wild Hyacinth. *Scilla festalis.* This very beautiful and elegant plant hangs its silken bells in darksome avenues of the woods when the soft caress of the fresh sylvan air heralds the advent of spring. It occurs mostly on siliceous soils, and shuns lime. The bulbs enclose inulin and starch as reserve materials; on 2nd July they have no starch or tannin, but a great quantity of a gelatinous substance which yields levulose and glucose by the action of dilute acids. The fresh leaves contain over 90 per cent. of water and are excessively mucilaginous; much carotin

and wax may be extracted from the dried substance and some free phloroglucin apparently, but no starch, sugar, or alkaloid is detectable; the fresh leaves yield 1.12 per cent. of ash rich in alkaline salts, in phosphorus (over 4 per cent.) and in sulphur, but poor in lime and silica. The flowers present the rare combination of richness and purity of tint with power and sweetness of scent. It is extremely difficult to determine precisely what the chromogen of the pigment really is, but that it is extremely sparse and exceedingly powerful there is not the slightest doubt, also that the particular period of the year and the shady covert wherein the efflorescence bursts into full expansion are agencies operative in the case. The ash of the flowers contains 44.7 per cent. soluble salts, 10 lime, 16.6 P_2O_5 , and 5.4 SO_3 . The whole plant is extremely rich in potass, soda, phosphorus, and chlorine, although no starch is ever produced in the leaves, the carbohydrate constituent of the mucilage being apparently the chief product of assimilation.

Dock. *Rumex obtusifolius*. This is a very familiar wayside plant, conspicuous by reason of its almost tropically-developed leaves. Its chemical development harmonises therewith; it is eminently pronounced. The root is a veritable storehouse of constituents, its tissues readily responding to the usual tests for starch, mucilage, resin, tannin, phloroglucin, etc. The tannin is iron-blueing, phlobaphenic, precipitates gelatine and bromine water, but not tartar-emetic, and yields on potass-fusion protocatechuic acid and phloroglucin. A special feature of the root which causes it to turn bright yellow (like medicinal rhubarb) when freshly cut is the presence of various derivatives of anthraquinone, viz., chrysophanic acid, nepodin and lapodin, all allied to alkannin, madder dye, etc., and like these yielding beautiful red colours in contact with alkalis. The leaves about 1st August contain much carotin and wax, but little or no fat or resin, also quercetin and tannin, free phloroglucin, very much pectosic mucilage, some starch and levulose (free or as inulin), very little proteid, but a copious supply of pectate of calcium and 11.7 per cent. of ash in dry, holding 43.4 per cent. soluble salts, 20 lime, 6.3 P_2O_5 , etc. In certain summers the leaves decay early and assume a very 'loud' flame of colour due to an admixture of carotin and ordinary erythrophyll. Altogether it is clear that in this plant the process of deassimilation is very advanced, and high hydrocarbon residues are produced which in these climes are uncommon and inexplicable save by cousinship with tropical outgrowths.

Figwort. *Scrophularia nodosa*. The floral parts of this organism present an extraordinary aspect and the plant itself

shoots up with eminent vigour and obtrusiveness. The chemistry is very noteworthy, indeed very remarkable in some respects. For instance, it contains free cinnamic acid, a body that is not found, I believe, in any other British plant. The leaves contain much carotin, some free palmitic and butyric acids, and a good deal of resin. The tannin is identical with that of coffee beans (caffetannin). Choline also occurs and some mucilage, but the amount of proteids, starch, sugars, etc., is evidently below the average. The ash of the dried leaves amounts to 8.9 per cent., and is rich in phosphorus and sulphur, moderately rich in lime, but rather below the average in potass. On the whole the plant is decidedly more odoriferous than would be supposed; in the course of the analysis the effluvia emanating from the various cinnamene derivates, the choline, and the butyric acid suggest and recall that even in darkest Britain there is a pseudo-imitation and aping after the 'perfumes of Arabia.' At all events, although the 'tropical' suggestiveness is not so strong as in the Dock tribe, the hydrocarbon derivatives being on a lower footing, we have here a plant whose chemical features are worthy of careful and profound study and contemplation.

Hawk-bit. *Hieracium hirtus* and *autumnalis*. The 'splitting' systematist revels in the Hawkweeds, but after all their physiology as revealed by chemistry does not seem to be quite so contentious or diverse. In fact, the entirety of one of the largest, best characterised, and most natural orders in the vegetable kingdom, i.e., the Compositæ, is distinguished by a special peculiarity in the process of deassimilation, whereby while an abundance of tannin is produced it is nevertheless incomplete, and hence there is likewise a very appreciable evidence of volatile oils, resins, bitter principles, etc. The plants under review do not present any very special feature. There is very little carotin in the leaves, but resin is present in considerable quantity. The alcoholic extract is bitter and contains rutin which precipitates bromine water, and a tannin which does not. The latter is allied to caffetannin and is a derivative of styrol. Some mucilage, a small quantity of inulin, but very little protein or starch are observable. The ash is very high, viz., 12.6 per cent., and is rich in lime, but rather poor in potass and phosphorus. The flower heads are tintured by carotin, and contain much rutin, some inulin, and (air-dried) 7 per cent. of ash having 44.3 per cent. soluble salts, 16.4 lime, 9.28 P₂O₅, and 5.8 SO₃.

Knapweed. *Centaurea nigra*. This is also a very common composite plant belonging to the division or sub-order Cynaro-

cephalæ of the great order Compositæ, which is specially eminent for a peculiarly repulsive bitterness of taste. The constituent to which this is due is called cnicin, and is of silky needles very soluble in alcohol, and may be regarded as a compound of resin with some impure or decomposed carbohydrate residue; it dissolves red in sulphuric acid, green in HCl. The leaves contain much carotin, also wax, resin, and fat-oil. It is rather peculiar that even as late as mid-October they contain a large quantity of rutin which precipitates bromine water, but not quinine, whereas the fully evolved tannin reacts precisely the reverse. There is no levulose, and very little detectable proteid or starch, but there is much oxalate of calcium in fine crystals, also 10 per cent. of ash in dry containing 37 per cent. soluble salts, 29.4 lime, 3.6 P_2O_5 , 4.9 SO_3 , and 5.8 CL. The flowers contain also much bitter principle, and their pigment although pure and beautiful is not well developed; the ash is rather small in quantity and contains 37.7 per cent. soluble salts, 15 lime, 11.4 P_2O_5 , and 4.5 SO_3 . It is clear, judging from the above analysis, that the division of Compositæ which this plant represents is even more backward, so to speak, in chemical development than the Corymbiferae.

Cranesbill. *Geranium pratense*. This plant, on the contrary, is extremely powerfully developed in a chemical sense. It is very local in distribution, doubtless for this very reason, its marvellous root appanage being very fastidious as respects quarters wherein to find a fully suitable lodgement. The chemistry of the rhizome vies with that of any of our native products of a similar character. Starch and mucilage are prominent constituents, and there is over 10 per cent. of tannin which is iron-blueing, and yields under the action of dilute acids a brilliant vermilion-red phlobaphene. It is a very distinctive catechol tannin with powerful chromogenic groups oxidised by alkalis to protocatechuic acid almost entirely (distinguished from Rosaceæ). The leaves exhibit a pretty commanding faculty for starch formation. They also contain tannin, considerable sugar, some malic and oxalic acid, but no free phloroglucin, and (blades only) 7.5 per cent. of ash in dry having 38.8 per cent. soluble salts, 25 lime, 9.5 P_2O_5 , etc. The pigment of the blossoms is highly developed and approaches a true blue as closely as any flax or balsam flower can possibly do. None of these, however, it may be averred, are genuine blues, they being invariably and, as it were, inevitably dashed with red, the approach to the coerulean tint being probably dependent on the comparative 'purity' of the chromogen, or perhaps it does not possess sufficient 'acidic functions.'





James H. King
June 1898



H. Spence.

HULL'S CONTRIBUTION TO SCIENCE.

T. SHEPPARD, F.G.S.,

*Secretary of the Yorkshire Naturalists' Union; Curator of
the Municipal Museum, Hull.*

(Continued from 'The Naturalist,' June 1903, p. 220.

It should be stated that a temporary revival of real scientific work in connection with the Society took place some years ago, when Dr. (now Sir) Albert Rollit took an interest in its proceedings. The exceptional ability and enthusiasm of this gentleman greatly improved the Society in many ways, and unquestionably it was a sorry day for Hull when he left the town for 'fresh fields and pastures new.'

The close of the career of the Hull Mechanics' Institute was surely anything but desirable. It was founded in 1825 'for the instruction of the members, at a cheap rate, in the principles of their respective arts, and in the various branches of science and useful knowledge.' As in the case of the Philosophical Society, Dr. John Alderson was the first president. The inaugural address was given in the Exchange Room; meetings were afterwards held in the Vicar's Room; and, later, three rooms were taken in Parliament Street. We then learn* that 'after some time the new society became important *and rich*'—frequently a bad sign! After one or two successful transactions, it built a suitable home in Charlotte Street;† but even this proved too small, and a house in George Street was bought, 'at the back of which a large lecture-hall‡ was erected.' In the autumn of 1842 the hall was opened with a *tea party*, public meeting, *concert*, and *ball*! A museum, model-room, and library were connected with the Institute. Bazaars, literary soirées, and polytechnic exhibitions were held, and half a century ago this Institution appears to have flourished well. To-day a few paintings, busts, and books scattered in different parts of the town are evidence of the former existence of the *Mechanics' Institute*. J. F. Young, a botanist of some repute, was its librarian.

In the midst of all this scientific activity an event took place which greatly stimulated the desire for knowledge, not only in our own town, but throughout the country. I refer to the great

* From Sheahan.

† Now used by Messrs. Forster & Andrews, organ builders.

‡ Now used as a music-hall!

Exhibition of 1851. Probably the full benefit to the country of this Exhibition will never be realised. It came at the right time, was managed in the proper way, and was one of the many successful achievements of the late Prince Consort. Its benefit to Hull, though of an indirect character, was unquestionable. A local committee was formed, and prepared a valuable case of Hull's exports and imports at that time. After the Exhibition, this case was placed in the Museum, together with a beautiful bronze medal which was awarded to the Hull Committee for the exhibit. The Museum still possesses the medal.

The maximum of interest in scientific matters at Hull may safely be said to have been in 1853, in September of which year the British Association visited this town. John Phillips, the first and energetic secretary of the Association, was early known to Hull scientific men. He had lectured to them; he had urged them to attend the meetings of the Association at Oxford and Cambridge. This was when the Literary and Philosophical Society was young, and its members who accepted Phillips' invitation returned to their friends with glowing accounts of the meetings; their enthusiasm became infectious. One result was that at the Belfast meeting in 1852 an invitation was received for the Association to visit Hull in the following year. A few weeks later* Charles Frost read a paper to his Society 'On the Prospective Advantages of a visit to the town of Hull by the British Association for the Advancement of Science.' This was printed and largely circulated. The idea evidently 'caught on'; the Corporation subscribed £100 to the guarantee fund for defraying the expenses of the visit, and the number of subscriptions of £50, £25, £20, and £10 from Hull people is, in the light of the present day, simply astonishing. Since then Belfast, Oxford, and Cambridge, the three places already mentioned, have each been visited twice by the Association; but not so Hull—not once—and there appears to be little prospect of a visit being again paid to this port for many years to come.

The 'Hull' Report of the '53 meeting is a substantial volume of over 400 pages, and indicates the amount of work accomplished, especially when it is remembered that most of the papers are printed in abstract. A perusal of its pages is of interest, and conveys some idea of the local activity at that time.

The papers discussed at the meetings were largely contributed by Hull workers, and the subjects were very varied. Amongst the local authors we find Dr. Horner, Dr. Munro,

* On November 16th, 1852.

Dr. Bell, Dr. (late Sir) Henry Cooper, Rev. J. Selkirk, James Oldham, J. G. Kemp, J. D. Sollitt, W. Lawton, and J. A. Forster—a truly magnificent array—all good men, but all, alas, no longer with us. Of the three papers selected to be printed in extenso in the report, two were by James Oldham, viz., ‘On the Physical Features of the Humber’ and ‘On the Rise, Progress, and Present Position of Steam Navigation in Hull’—both exceedingly valuable contributions. J. D. Sollitt, an ardent microscopist, wrote ‘On the composition and figuring of the Specula of Reflecting Telescopes,’ ‘On the Chemical Constitution of the Humber Deposits’ (a paper having some bearing on the recent discussion on the origin of the Humber mud); also a paper—in conjunction with R. Harrison—‘On the Diatomacea found in the Neighbourhood of Hull.’ Sollitt, like Robert Harrison and George Norman, was greatly interested in diatoms, and at least one species (*Aulacodiscus Sollittianus* Arnott*) was named after him. It should be stated that the local microscopists at that time were exceptionally active and paid particular attention to the manufacture of their lenses, obtaining much more successful results with their instruments than was achieved by workers in other parts of the kingdom.

William Lawton, Hull's greatest Clerk of the Weather, contributed a paper ‘On the Meteorology of Hull,’ in which he refers to the observations taken by Dr. Fielding and the Literary and Philosophical Society. This excellent work is now carried on in Pearson's Park.

F. J. Pearsall, F.C.S., the first salaried curator to the Hull Museum, read three papers to the chemical section, viz., ‘On changes observed in wood from the Submerged Forest at Wawne, in Holderness,’ ‘On Crystals from the sea coast of Africa,’ and ‘On Lime Flowers, or peculiarly-formed substances from the brickwork of one of the Reservoirs of the Hull Waterworks before final completion for use.’ G. G. Kemp wrote ‘On the Waste of the Holderness Coast,’ and fifty years later the same subject forms the title of numerous papers and articles of varying worth.

In the Zoological section Dr. Horner read notes ‘On some Discoveries relative to the Chick in Ovo and its liberation from the Shell.’ Ethnology was represented by Charles Beckett, who discoursed ‘On the Dialects north and south of the Humber, compared.’

*A specimen of this has recently been taken by Mr. R. H. Philip, in the river Hull, near Haworth Hall.

Dr. Henry Cooper read papers 'On the Mortality of Hull in the autumn of 1849'* and 'On the Prevalence of Diseases in Hull.' Dr. Munro contributed 'Statistics relative to the Northern Whale Fisheries from 1772 to 1852,' a paper containing many interesting figures, as does also a paper 'On the Causes, Extent, and Prevention of Crime, with especial reference to Hull,' by the Rev. James Selkirk, chaplain to the Hull Gaol. J. A. Forster and George Locking read papers to the section on Mechanics, but these hardly come within the scope of these notes.

Such is a summary of the titles of the scientific papers read at that meeting of the association. Were a meeting to be held here this year it is pleasing to be able to state that there would not be any difficulty in securing valuable papers by local workers on as great a variety of subjects as those read in 1853. But that is on account of the revival in scientific matters that has taken place in recent years. Fifteen or twenty years ago it would have been impossible to have done this.

In 1840 the Hull Zoological Gardens, consisting of about seven acres of land, were opened and were much appreciated for a time. They were situated on Spring Bank and contained many valuable animals. In its latter days various non-zoological attractions were introduced to secure support, and the gardens were abandoned about 1862, the site now being built upon. A fountain, the 'ruins,' various trees, etc., were transferred to the parks.

The Botanic Gardens, in Linnæus Street, were established in 1812, and were eventually transferred to that excellent site now occupied by Hymers College and grounds. They shared the same fate as that of the Zoological Gardens. A brief reference will be made to them later. Botanic Gardens Station will ever remind Hull people of what they have lost, though to a certain extent three parks carry on the work.

References should be made to the work accomplished by Hull societies other than those already mentioned. Apparently the earliest of these was founded in June 1792 by the then Vicar (Rev. J. H. Bromby) and eight others. This was called the 'Society for Literary Information,' and seems to have had a successful career for five or six years. The more important papers read at the meetings were selected for printing, and the manuscripts were bound into two large quarto volumes—one of

* On the occasion of the cholera outbreak.

Naturalist,

which, I believe, is still in the possession of Mr. E. S. Wilson, of Hull. The papers were never printed.

Half a century ago Hull had a 'Micro-Philosophical Society'—a curious title, subsequently changed to the Hull Natural History and Microscopic Society. George Norman, William Hendry, and a few others met at the Royal Institution bi-monthly, and published the very valuable results of their work in the 'Microscopical Journal' and other publications. The 'Diatom' fever was then at its height, and almost everyone fortunate enough to possess the then expensive luxury, the microscope, sampled drains, ditches, ponds, and earth in search of these beautiful and varied forms of life.

The Hull Microscopic Society—consisting of gentlemen who met alternately at each other's private residences—also flourished at that time, and supplied articles to the London scientific journals dealing with the work accomplished. Probably the portrait of Dr. Henry Cooper sitting at a table with his microscope, now hung in the Council Room at the Royal Institution, is a relic of one of these enthusiasts.

In the early 'eighties the Hull Field Naturalists' Society was founded, its scope being well indicated by its title. Its members met at the Royal Institution. Somehow, however, interest in its work seemed to 'fag,' new members were difficult to obtain, and a few years ago the Society 'amalgamated' with the Hull Scientific Club, which consisted for the most part of younger men, and was founded in 1886. The Field Naturalists' Society numbered amongst its earlier members the late E. Peak, Mr. N. F. Dobrée, Mr. J. Stears, Mr. G. H. Hill, and others. It issued no publications, however, and few records of its work appear to exist. The Hull Scientific Club (called the Hull Scientific and Field Naturalists' Club since the amalgamation) has always encouraged young workers as well as older men, and its present flourishing condition is no doubt largely due to this fact. In 1898 it issued the first of a series of Transactions—a modest pamphlet of 28 pages, and since then each annual publication has increased in size, the volume for 1902 having over 250 pages. These volumes contain papers read at the club's meetings, and are of some value, inasmuch as they contain original papers of *local* interest only.

The first meetings of the Scientific Club were held in a small room in Scale Lane, and, after two or three changes as the membership increased, is now lodged in the Young People's Institute.

The Hull Geological Society was founded in 1888, and has met regularly in the Royal Institution. Since 1894 it has issued a small volume of Transactions periodically, containing particulars of papers read at its meetings and of work done in the field. Mr. J. W. Stather and Dr. F. F. Walton are prominent members, and to these gentlemen the formation and present condition of the society is largely due.

A few remarks relating to those who have done and are doing so much in the local paths of science may not now be out of place. To some of these reference has already been made. I believe in *every* instance it is interesting to note the work accomplished has been as a hobby, and quite apart from the professional callings of the respective authors.

To a large extent bygone Hull naturalists and scientific men are now known by the amount of work they *published*. There were doubtless many who were very influential and did good and conscientious work of whom we know but little, simply because they were reluctant to put pen to paper. Unless one places the results of his work in some permanent form, it soon becomes lost to the world—a couple of generations usually suffices to delete him altogether from scientific history.

One of Hull's foremost scientific worthies was unquestionably William Spence, F.R.S., F.L.S. Though not born at Hull,* he was so intimately connected with the town, and accomplished so much work whilst residing at Drypool, that he cannot well be omitted. Locally, he was probably best known as a partner in the firm of Blundell, Spence & Co., and as the first Editor of the Hull 'Rockingham,' a noted Whig newspaper, which started in 1808 and survived till 1843. In 1807 he wrote a pamphlet, formerly well known, entitled 'The Radical Cause of the Present Distress of the West Indian Planters pointed out, and the Inefficacy of the Measures which have been hitherto Proposed for Relieving them Demonstrated.' This was followed by 'Britain Independent of Commerce,' a work which established his reputation as a political economist, and other similar productions. To naturalists Spence will be for ever known for the remarkable production, 'An Introduction to Entomology; or, Elements of the Natural History of Insects,' published in four volumes between 1815 and 1826.† This was in conjunction with the Rev. William Kirby. The fourth volume contains an

* Born at Bishop Burton, near Beverley.

† The delay in publishing the volumes was on account of Spence's ill-health, which also necessitated his leaving Hull for the South of England about 1819.

engraving of Spence as frontispiece, and my copy (which was a presentation copy to the Holderness Agricultural Society) also has his autograph. The work has been several times reprinted, in England and abroad. In 1809 he commenced writing scientific papers, and in that year submitted a 'Monograph of the British Species of the Genus *Choleva*' to the Linnæan Society. Some 'Observations on the Disease in Turnips,' termed in Holderness 'Fingers and Toes,' were read to the Holderness Agricultural Society in 1811, and printed at their request in the following year. This runs into 20 pages. Later, he was president of this Holderness society.* In 1811 the 'Rockingham' contained an able article from his pen on the 'Pleasures and Advantages to be Derived from the Establishment of a Botanical Garden at Hull.' Spence died in 1860. A fine marble bust by Marachetti is in the Hull Museum, and there is a portrait in the office of Messrs. Blundell, Spence & Co., Beverley Road.

A contemporary of Spence was Adrian Hardy Haworth, F.L.S. (1767 to 1833), who also made his mark as a botanist and an entomologist. Like Spence, also, the work for which he will be remembered by scientific men deals with butterflies and moths, and was in four parts. The '*Lepidoptera Britannica*' contains in all about 640 pages.† Haworth was born at Hull of an old and well-connected family which had been for many years engaged in mercantile pursuits. He was articled to a solicitor,‡ but in consequence of Mr. Frost's death his clerkship was not completed. He then 'retired to Cottingham, where he resided a few years and then married.' He afterwards went to Chelsea, where '*Lepidoptera Britannica*' was written.

About the year 1812 he resolved to return to his native place, Cottingham, and thither he repaired with the greater part of his collection of natural history objects. During his short stay at that place (for he only resided there about five years) he was principally instrumental in forming and arranging systematically the Botanic Gardens at Hull. The neighbourhood of London was, however, evidently the field most adapted

* Other scientific papers of his are :—'On an Insect which is Occasionally very Injurious to Fruit Trees,' 'Vulgar Errors among Gardeners respecting Insects being Destroyed by Cold,' 'Observations relative to Dr. Carns's Discovery of the Circulation of the Blood in Insects,' 'Remarks on Planting Trees and Shrubs in Masses of one Species,' and numerous others, printed in the 'Gardeners' Magazine,' the 'Magazine of Natural History,' the 'Transactions of the Horticultural Society,' etc.

† The first part was printed in 1803 and the last in 1828.

‡ Mr. Frost, father of the historian.

to a mind so ardently endued with the love of scientific pursuits; accordingly he soon again left his native county, and resided at Chelsea till 24th August 1833, the date of his death. He died of cholera.

Haworth was a voluminous writer, and, in addition to his papers read before the Linnæan, Entomological, and Horticultural Societies (of all of which he was a member), he contributed no fewer than thirty-one articles to the 'Philosophical Magazine' between 1823 and 1833. These were mostly descriptions of new species of succulent plants from South Africa, which Haworth says were 'flourishing in the Royal Gardens at Kew, and [were] all sent thither from their native wilds by their discoverer, Mr. Bowie, our Gracious Sovereign's most successful collector of succulent plants.'

In connection with these descriptions Haworth's early training at the Hull Grammar School stood him in good stead; they are all written in Latin.

Haworth had a genus of plants named after him (*Haworthia*, allied to the genus *Aloë*), and the species, *Mesembryanthemum Haworthii*. In entomology his name will ever be remembered by Haworth's Minor (*Celæna Haworthii*) and others.

Between 1814 and 1817 Haworth wrote a lengthy poem, entitled 'Cottingham,' part of which was printed. Twenty-four pages were in the possession of his grandson, the late Col. Haworth-Booth, but I understand that there are at least 116 pages in existence. The poem professes to be a history of 'Cottingham from the earliest times, and refers inter alia to other items of more general interest.

Peter William Watson, F.L.S. (1761 to 1830), also educated at the Hull Grammar School (under the Rev. Joseph Milner), had a great interest in many branches of science and was also an accomplished artist. The work that will keep his memory green amongst all scientific men was "'Dendrologia Britannica," or trees and shrubs that will live in the open air of Britain throughout the year.' This is contained in two octavo volumes, and was printed at Hull in 1825, five years before his death, and the numerous and beautifully-coloured plates greatly enhance its value. In connection with its preparation he had the advantage of the very fine collection in the Hull Botanic Gardens, and of this he made full use. Beyond 'Dendrologia Britannica' Watson does not seem to have left much for our edification.

(To be continued.)



Yorkshire Naturalists at Filey.

YORKSHIRE NATURALISTS AT FILEY.

30th MAY—1st June 1903.

No doubt the glorious weather immediately preceding the excursion was largely responsible for the success of the 172nd meeting of the Union at Filey. On the Saturday morning about two dozen members started at Speeton Station for the cliffs, joined by Mr. C. G. Danford, of Reighton, who has recently made some important 'finds' in the Speeton and Kimeridge Clays. Unfortunately, a thick mist obstructed what would have been a glorious view of the Speeton Cliffs, and this also hung about throughout all the excursion, with the exception of a few hours on the Monday afternoon.

On reaching the shore the party took a southerly direction, and found that the sea had bared a magnificent section in the red chalk, about 120 yards long, one of the finest exposures that has been visible for many years. From it the characteristic fossils were freely gathered.

The Speeton Clay, to the north of the gap in the cliffs, has been wretchedly poor for collecting for some time, owing to landslips, etc. Mr. Danford pointed out an exposure of the 'Coprolite bed,' at the base of the series, however, which was new to most of those present. The remainder of the afternoon was occupied in examining the drift and boulders around Filey Bay.

In the evening over thirty members met at Foord's Hotel, under the chairmanship of Mr. G. T. Porritt. A paper by the Rev. W. C. Hey, entitled 'Shore Collecting at Filey and Scarborough,' was read by Mr. T. Petch. In this an appeal was made for more workers amongst the marine fauna and flora. Mr. J. W. Stather gave an address on some recent geological discoveries in the district, in which he referred to Dr. A. W. Rowe's work on the chalk zones; to Mr. Danford's record of a nearly complete skeleton of *Ichthyosaurus thyreospondylus*, from the Kimeridge Clay at Speeton, a new record for the county;* and the glacial striæ on the limestone underlying the Boulder Clay in the vicinity of Filey Brig. Some of these he had himself recorded. He also referred to recent advances in the study of the ice-borne erratics. A paper by the Rev. E. M. Cole, entitled 'Roman Remains near Filey,' was read by the secretary. This described the relics found after a landslip on the north side of Carr Naze, in 1857. Mr. A.

* See 'The Naturalist,' 1902, p. 170.

White gave a description of an opossum which had recently been caught alive in Leeds, having been imported in a crate of bananas. Interesting discussion followed the various addresses, and the hope was generally expressed that the reading of papers might be continued at future week-end meetings of the Union.

On the following day Mr. T. Petch, with a small following, visited the Brig in search of marine life; the botanists took the south shore of Filey Bay, and the geologists went to Scarborough by train, and joined the members of the Leicester Literary and Philosophical Society in a ramble around Castle Hill, under the guidance of Mr. C. Fox-Strangways, of H.M. Geological Survey. The change in the appearance of this grand piece of cliff, in



Filey Brig.

consequence of the 'marine drive' in course of construction, was not generally appreciated by the visitors.

In the afternoon the party assembled at the museum, where some of the type specimens collected years ago by some of Yorkshire's foremost geologists, were described by the leader. The visitors were informed that steps were to be taken to classify and re-arrange the exhibits. It is to be hoped that the museum possesses a big cellar! An interesting collection of local freshly-gathered wild flowers, in vases, labelled and localised, met with general appreciation, and the plan might be followed with advantage in other museums.

On Monday morning the members were early astir. Each train brought more arrivals, and by noon over a hundred members and associates were present, as well as a few teachers, members of the East Riding Nature Study Committee, with their secretary, the Rev. R. G. Pyne. It was also most gratifying to find a large proportion of the Union's older workers present.

One party, accompanied by a number of the county's leading botanists, took the cliffs to the south of Filey. Mr. Petch had a larger following with him on the Brig than on the previous days, and no doubt another visit would have 'converted' some of the members to the study of marine zoology. The lepidopterists, conchologists, etc., devoted their attention to the slopes of the cliffs, and elsewhere. Perhaps the largest party consisted of geologists and would-be geologists who examined the cliffs between Filey and Cayton Bay, headed by Mr. J. W. Stather and Mr. W. H. Crofts. The Calcareous Grit, forming the Brig, proved particularly productive of fossils, and yielded a nautilus, three species of ammonites, and a host of univalves, echinoderms, brachiopods, and lamelli-branches. The small urchin, *Echinobrissus scutatus*, was very plentiful on the weathered ledge of rock immediately under the boulder clay. On the Brig the 'Ball-bed,' with its characteristic concretions, and ramifying root-like structures, was pointed out, and could be traced for some distance in the cliffs. The crump-lings in the upper layers of limestone, due to ice-pressure, were also well seen.

After examining the Brig the cliffs were ascended, and traversed along the top to Gristhorpe Bay, when the beach was again taken and followed as far as the pumping station in Cayton Bay, where wagonettes awaited the arrival of the members and conveyed them back to Filey. The well-known plant-beds in the Estuarine series, the fault at Red Cliff, and the grand exposure of Cornbrash, Kellaways Rock, Oxford Clay, and Calcareous Grit were pointed out, though the time at the disposal of the party did not admit of much collecting. A few interesting erratics were noted, particulars of which will eventually appear in the Boulder Committee's Report.

Towards tea-time the members assembled at Foord's Hotel, Filey, but in such numbers that the two largest rooms available could not contain them all. The landlord, however, seemed to have an unlimited larder, fortunately. Afterwards, the meeting was held in the open air behind the hotel, the President occupying

an upturned tub in place of a chair. On the roll-call being called it was found that eighteen societies were represented. Reports of the work accomplished were given by the various officers, particulars appearing below. A vote of condolence with the family of the late Samuel Chadwick, F.G.S., formerly of Malton, was passed. Thanks were tendered to those who had assisted in the excursion, and to the president for his services. Three new members were elected.

A few remained in the district the following day, examining the chalk in the vicinity of Flamborough.

For the vertebrate section Mr. Riley Fortune reports that the principal attraction was the birds at Speeton and Bempton, but unfortunately a dense sea 'fret' which prevailed all the time prevented a fair view being obtained. From enquiries made of the 'climbers' we learn that the birds are later than usual in laying this year, and that they appear to start later every season. The usual species are in strong force, and it is particularly gratifying to find that the beautiful Kittiwake is steadily increasing in numbers. A good many Starlings (which seem to be at home everywhere) were feeding their young in the cliffs.

A few members visited the cliffs on Tuesday, and were rewarded by having a fine day. They were greatly interested in seeing the Herring Gulls on the look out for eggs. These robbers sailed along the face of the cliff, and directly they 'spotted' an egg impaled it upon their beaks and flew out to sea with it. They then dropped it, and dived and secured it, and then enjoyed the fruits of their 'commandeering' expedition.

Tree Pipits were exceptionally numerous, and about the gorse and bramble bushes on the cliff top south of Filey warblers were very abundant, Sedge Warblers and Whitethroats especially so. The Swallow tribe was very scarce, but this seems to be the case all over the county. Swifts, however, are plentiful. It may be interesting to note that in a shed visited north of Filey no fewer than fourteen pairs of birds had their temporary home, and fourteen nests, containing either eggs or young, were built therein. A pair of Starlings had, as usual, built their nest in the bulb of the pump used for watering the engines in Filey Station, and their young were just about ready to fly.

To the south of Filey is a charming ravine known as Hunmanby Gap. A narrow footpath runs the whole length of this, and the Thrushes had converted the path into perfect shambles. It was literally strewn with broken snail shells, and

many of the stones upon which the shells were broken in order to extract the contents were quite slimy from constant use.

The following is a complete list of species observed; most of the birds were found nesting, and had either eggs or young:—

MAMMALS (7).

Pipistrelle Bat.	Mole.	Water Vole.	Rabbit.	Hedgehog.
	Shrew.		Hare.	

BIRDS (48).

Missel Thrush.	Wren.	Corn Bunting.	Rock Dove.
Song Thrush.	Pied Wagtail.	Yellow Bunting.	Stock Dove.
Blackbird.	Meadow Pipit.	Skylark.	Pheasant.
Whin Chat.	Tree Pipit.	Starling.	Partridge.
Redbreast.	Swallow.	Jackdaw.	Waterhen.
Whitethroat.	Martin.	Carriion Crow.	Lapwing.
Garden Warbler.	Sand Martin.	Rook.	Oystercatcher.
Willow Wren.	Greenfinch.	Swift.	Herring Gull.
Sedge Warbler.	Sparrow.	Cuckoo.	Kittiwake.
Hedge Sparrow.	Tree Sparrow.	Kestrel.	Guillemot.
Great Tit.	Chaffinch.	Cormorant.	Razorbill.
Blue Tit.	Linnet.	Ring Dove.	Puffin.

AMPHIBIA (1).

Frog.

REPTILIA (1).

Common Lizard.

FISHES (5).

Lesser Weever.	Short-spined Sea Bullhead.	Blenny.
	Common Dab.	Salmon.

Mr. T. Stainforth adds that on the cliffs north of Filey many lizards were seen running actively about. One of the party secured a specimen by its tail, whereupon the creature snapped off this seemingly unnecessary appendage, and escaped.

For the conchologists Mr. J. E. Crowther reports that his section included the Rev. W. C. Hey, Messrs. W. Denison Roebuck, T. Petch, and T. Castle.

Considering the number present, and that several of the members spent the week-end in the district, the result of their work is perhaps not so good as might have been expected. Altogether, the number of species noted was 32, made up of 7 slugs, 16 land and 9 fresh-water species. The most noteworthy of these is *Amalia sowerbyi*, found near the railway station by Messrs. Hey and Roebuck; *Pupa anglica*, by Mr. Petch (which had not been previously recorded for the district south of Filey), and a large form of *Limnæa palustris*, found by Mr. Castle in one of the ponds on the cliffs south of Filey. *Helix nemoralis* was very abundant and variable; Mr. Castle, who devoted special attention to this species, noting no fewer than 19 varieties of colour and banding. The following is a complete list of the species recorded:—

<i>Arion ater.</i>	<i>Helix aspersa.</i>	<i>Cochlicopa lubrica.</i>
<i>Arion subfuscus.</i>	<i>Helix nemoralis.</i>	<i>Succinea putris.</i>
<i>Arion minimus.</i>	<i>Helicigona arbustorum.</i>	<i>Planorbis fontanus.</i>
<i>Arion circumscriptus.</i>	<i>Helicella cantiana.</i>	<i>Planorbis spirorbis.</i>
<i>Amalia squerbyi.</i>	<i>Helicella itala.</i>	<i>Planorbis contortus.</i>
<i>Agriolimax agrestis.</i>	<i>Helicella virgata.</i>	<i>Limnæa peregra.</i>
<i>Agriolimax lævis.</i>	<i>Hygromia rufescens.</i>	<i>Limnæa palustris.</i>
<i>Vitriina pellucida.</i>	<i>Hygromia hispida.</i>	<i>Limnæa truncatula.</i>
<i>Vitriina cellaria.</i>	<i>Pupa anglica.</i>	<i>Sphærium corneum.</i>
<i>Euconulus fulvus.</i>	<i>Pupa cylindracea.</i>	<i>Pisidium fontinale.</i>
<i>Vallonia pulchella.</i>	<i>Clausilia bidentata.</i>	

Amongst the Lepidoptera very little appears to have been accomplished. Mr. Stainforth notes that the larvæ of *Zygæna lonicæ* were abundant on the cliffs north of Filey.

Mr. M. L. Thompson writes that the Yorkshire Coleoptera Committee was never before so well represented as at this meeting, amongst those present being the Rev. W. C. Hey, Messrs. E. G. Bayford (chairman), H. Ostheide, Pearson, Stainforth, and the Secretary. They investigated various parts of the cliffs and shore, the dry part of the Brig, and some ponds on Filey cliffs. The following beetles were met with in their respective habitats:—

<i>Cicindela campestris</i> L.	<i>Anacæna globulus</i> Payk.
<i>Nebria livida</i> F.	<i>Anacæna limbata</i> F.
<i>Elaphrus cupreus</i> Duft.	<i>Laccobius sinuatus</i> Mots.
<i>Badister bipustulatus</i> F.	<i>Limnebius truncatellus</i> Thoms.
<i>Bradycellus distinctus</i> Dej.	<i>Helophorus brevipalpis</i> Bedel.
<i>Harpalus puncticollis</i> Payk.	<i>Helophorus aquaticus</i> L.
<i>Pterostichus strenuus</i> Panz.	<i>Chætarthria seminulum</i> Herbst.
<i>Anchomenus albipes</i> F.	<i>Henicocerus exsculptus</i> Germ.
<i>Anchomenus viduus</i> Panz.	<i>Octhebius pygmaeus</i> F.
var. <i>Mæstus</i> Duft.	<i>Stenus speculator</i> Er.
<i>Bembidium anglicanum</i> Sharp.	<i>Stenus flavipes</i> Steph.
<i>Bembidium littorale</i> Ol.	<i>Stenus pubescens</i> Steph.
<i>Bembidium nitidulum</i> Marsh.	<i>Oxytelus laqueatus</i> Marsh.
<i>Trechus minutus</i> F.	<i>Oxytelus sculpturatus</i> Grav.
<i>Dromius linearis</i> Ol.	<i>Rhizobius litura</i> F.
<i>Haliphus ruficollis</i> De G.	<i>Meligethes æneus</i> F.
<i>Cælambeus inæqualis</i> F.	<i>Meligethes picipes</i> Sturm.
<i>Cælambeus confluent</i> F.	<i>Enicmus transversus</i> Ol.
<i>Hydroporus lineatus</i> F.	<i>Corticaria denticulata</i> Gyll.
<i>Hydroporus palustris</i> L.	<i>Micrambe vini</i> Panz.
<i>Hydroporus erythrocephalus</i> L.	<i>Atomaria mesomelas</i> Herbst.
<i>Hydroporus pubescens</i> Gyll.	<i>Agriotes pallidulus</i> Ill.
<i>Hydroporus planus</i> F.	<i>Athous Læmorroidalis</i> F.
<i>Agabus bipustulatus</i> L.	<i>Dolopius marginatus</i> L.
<i>Dytiscus marginalis</i> L.	<i>Telephorus Læmorroidalis</i> F.
<i>Gyrinus natator</i> Scop.	<i>Phædon tumidulum</i> Germ.
<i>Hydrobius fuscipes</i> L.	<i>Prasocuris phellandrii</i> L.

Longitarsus luridus Scop.*Crepidodera rufipes* L.*Apion dichroum* Bedel.*Apion pisi* F.*Apion humile* Germ.*Phyllobius oblongus* L.*Phyllobius pomonæ* Ol.*Barynotus obscurus* F.*Tanysphyrus lemne* F.*Mecinus pyrauster* Herbst.*Poophagus sisymbrii* F.*Ceuthorrhynchidius troglodytes* F.

With regard to *Nebria livida*, Mr. Stainforth points out that it is gratifying to confirm previous reports of this species at Filey, though it did not occur plentifully. The specimen recorded was found about half-a-mile south of Filey, by detaching loose pieces from the clay cliffs, about five feet from the beach. It is interesting to note that this species occurs in suitable places along the entire Yorkshire coast, and up to a few years ago could be taken on the shore of the Humber estuary near Hull.

The Tiger Beetle (*Cicindela campestris*) was very abundant on the clay cliffs above Filey Brig, and the sandy part of the cliffs were dotted over by the burrows of the larvæ, which could be obtained in plenty by carefully digging a few inches down.

Besides those mentioned below, the botanical section included Dr. W. G. Smith, Messrs. M. B. Slater, J. J. Marshall, and J. F. Robinson. The last writes:—The margin of the bay south of Filey is a portion of the East Riding that appears to have had scanty attention paid to it by the botanist. So it was an agreeable surprise to the party who made their way towards Primrose Valley and beyond, to find there was a remarkably fine bit of almost virgin soil to investigate. Notwithstanding its boulder-clay character, the much-slipped and undulating strip of land between cultivation and the sea is very fertile indeed, and productive of a host of flowering plants. Gorse* (whin or furze) in such golden glory as is rarely to be seen elsewhere, blossomed in dense profusion, almost hiding its stunted bushes. Although not all in flower there were noted on the ground traversed *Parnassia*, *Sanguisorba officinalis*, *Eupatorium*, *Alchemilla vulgaris*, *Orchis mascula*, the only bright-flowered species of orchis to be seen hereabouts, and *Habenaria viridis*. Of the higher cryptogams there was a fair quantity of *Pteris*, *Aspidium*, *Lastrea dilatata*, *Equisetum maximum*, *E. arvense*, *E. palustre*, and *E. limosum*. The two last were most conspicuous in the frequent ponds that are found in hollows on this boulder-clay tract; and with them were growing *Ceanothe fistulosa*, *Menyanthes* in its first pale pink, fringed flowers, *Sparganium simplex*,

* Also particularly fine on the slopes near Gristhorpe Bay.

Iris, *Potamogeton natans*, etc. But the associations of plants in these ponds seemed to vary considerably. On marshy ground the following were found:—*Anagallis tenella*, *Pinguicula vulgaris*, *Pedicularis palustris* (some specimens with pure white flowers), *Eriophorum latifolium*, *Juncus effusus*, and *J. glaucus*.

The slopes of Primrose Valley bear a particularly interesting association of plants, quite the like of which we do not know of elsewhere in the East Riding.

It includes the following:—*Viola hirta*, *V. Riviana*, *Polygala* sp.? *Geranium sanguineum*, *Ulex europæus*, *Genista tinctoria*, *Lathyrus montanus*, *Spiræa Filipendula*, *Poterium sanguisorba*, *Rosa spinosissima*, *Serratula tinctoria*, *Carlina vulgaris*, and *Stachys Betonica* (every plant infested with the characteristic brown micro-fungus). Of these, the *Geranium*, *Spiræa*, *Rosa*, and *Stachys* were certainly dominant and about equally so.

Several bryologists attended this excursion, and devoted their attention to the cliffs south of Filey, and entirely in the East Riding.

Mr. W. Ingham reports:—The *Sphagna* or bog mosses appear to be entirely absent from these boulder clay cliffs, as none were seen. Of other mosses a good number was noted, all being on the top of the cliffs in damp and shady places, none being seen on the vertical faces. The mosses noted on three miles of cliffs southward are:—*Fissidens taxifolius* Hedw., *F. bryoides* Hedw., *Ditrichum flexicaule* Hpe., *Dicranella heteromalla* Schp., *D. varia* Schp., *Ceratodon purpureus* Brid.; *Barbula tophacea* Mitt., both a very tall state, known as *forma luxurians* Braithw., and the normal state in abundant fruit; *B. unguiculata* Hedw., *Weisia viridula* Hedw., *Trichostomum crispulum* Bruch., *Tortula subulata* Hedw.; *Zygodon viridissimus* R. Br., and *Ulotia phyllantha* Brid., still existing on a tree in Primrose Valley; *Webera albicans* Schp.; *Bryum pseudo-triquetrum* Schwæg.; *Bryum capillare* L., near *V. rosulatum* Mitt., *Thuidium tamariscinum* B.&S., *Pleuropus sericeus* Dixon, *Camptothecium lutescens* B.&S., *Brachythecium albicans* B.&S., *B. rutabulum* B.&S., *B. velutinum* B.&S., *B. purum* Dixon, *Eurhynchium prælongum* B.&S., *E. striatum* B.&S., *E. rusciforme* Milde, *Amblystegium serpens* B.&S., *A. filicinum* De Not, *Hypnum polygamum* Schp. *H. Stellatum* Schreb.; *H. aduncum* Hedw., var. *Kneiffii* Schp., *H. cuspidatum* L., and *H. commutatum* Hedw., found by Mr. Marshall in fine fruit, and with its stems encrusted with lime, as is nearly always the case with this moss. This species has only once previously

been recorded for the East Riding. Its habitat at Filey is most singular, as pointed out by Mr. Marshall, as the plant is usually associated with dripping limestone rocks.*

These cliffs are not a suitable home for Hepatics, and few only were noticed, viz. :—*Diplophyllum albicans* L., *Lophocolea bidentata* L., *Kantia trichomanis* L., *Frullania dilatata* L., *Jungermania turbinata* Raddi., *Aneura latifrons* Lindb., and another with the name doubtful at present. Five species of mosses and two of Hepatics were added to those already known from these cliffs, and Mr. Marshall deserves credit for adding three of the former and both the latter.

The mycological contingent consisted of Messrs. T. W. Woodhead, T. Petch, C. H. Broadhead, W. Haley, and the secretary of the Mycological Committee, Mr. C. Crosland, who writes :—Large fungi, as a rule, not appearing in any quantity until the month of August, were not looked for. One exception, however, the St. George's mushroom, *Tricholoma gambosum*, comes in spring, and was met with in pastures at Gristhorpe, and on the cliffs at Filey. *Collybia velutipes*, a semiparasitic agaric, was also noted growing in clusters from one of the branches of a sickly Wych elm.

Attention was given to the discovery of minute species and plant diseases. Thirteen of the latter were met with, some very prevalent. The coltsfoot, all along the cliffs, both north and south, was badly infested with *Puccinia pourum*, and every plant of wood betony, in the first valley to the south, with *Puccinia betonica*. Here, a wild-rose bush was nearly smothered with the orange uredo spores of *Phragmidium subcorticatum*. Nearly all the plants of the thistle, *Carduus arvensis*, on the cliffs, were covered with *Puccinia suarveolens* pustules, even to the very youngest leaves. We did not see much of the marsh marigold rust, only near the bog-bean and bur-reed pond beyond the encampment field.

In a branch of the valley a patch of most productive ground for saprophytic micro species was found. The place was a moist bank adjoining a small, rapidly-running rill. The vegetation was typical of such a spot, the plants most in evidence being (in order of predominance) codlins-and-cream, meadow sweet, marsh marigold, the grass *Deschampsia cespitosa*, angelica, fig-wort, iris, the sedge, *Carex riparia*, and sprinklings of one or two others. The community appeared to be a very happy and

* Mr. Ingham adds that he has *Hyphnum commutatum* in his herbarium, gathered at Filey in August 1897, and less than ten minutes' walk south.

healthy one, none of the plants being in the least diseased. (On the other side of the rill rose-campion was attacked by *Puccinia lychnidearum*.) It was the dead, out-of-sight plant debris, the remains of last year's growth, hid by the new vegetation, that we had to get at and examine before finding anything. Seventeen species of saprophytes, minute but all in fine condition, rewarded a search of a few square yards. *Helotium cyathodeum* and *Dasyscypha virginea* occurred in great abundance. The mint rust was seen in a garden, and the mallow rust by the roadside, both near the shore at Filey.

The following is a list of the species found:—

BASIDIOMYCETES.

- Tricholoma gambosum*, in pastures.
Collybia velutipes, on living Wych Elm.
Mycena capillaris, on decaying herb stems.
Mycena stylobates, on rootstock of Meadow Sweet.
Pleurotus variabilis, on dead leaves.
Stropharia semiglobata, on cattle dung.
Clavaria uncialis, on dead Umbellifer stems.
Phlebia vaga, on dead *Ulex* stems.
Corticium incarnatum, on dead *Ulex* stems, common.

UREDINEÆ.

- Puccinia galii*, *Æcidium* stage, on Crosswort.
Puccinia calthæ, *Æcidium* stage, on Marsh Marigold.
Puccinia pimpinellæ, *Æcidium* stage, on Cow Parsnip.
Puccinia menthæ, *Æcidium* stage, on Garden Mint.
Puccinia poarum, *Æcidium* stage, on Coltsfoot.
Puccinia suaveolens, *Uredo* stage, on Thistle (*C. arvensis*).
Puccinia oblongata, *Uredo* stage, on field Wood-rush.
Puccinia lychnidearum, *Uredo* stage, on Red Campion.
Puccinia betonicæ, on wood betony.
Puccinia bunii, on Earth-nut.
Puccinia malvacearum, on Marsh Mallow (*M. sylvestris*).

- Phragmidium fragariastrum*, *Æcidium*, on barren Strawberry.
Phragmidium subcorticatum, *Æcidium*, on Wild Rose.

PYRENOAMYCETES.

- Lophiostoma caulium*, on dead stems of *Epilobium hirsutum*.
Sphaeria complanata, on dead herbaceous stems.
Sphaerella rumicis, on living leaves of Cowdock.

DISCOMYCETES.

- Sphaerospora trechispora*, on the ground among moss.
Helotium cyathodeum, on dead herb stems, common.
Mollisia dilutella, on dead stems of *Epilobium hirsutum*.
Mollisia atrata, on dead stems of Meadow Sweet.
Belonidium deparculum, on dead stems of Meadow Sweet.
Dasyscypha virginea, on dead herb stems, common.
Dasyscypha albo-testacea, on dead grass stems.
Dasyscypha punctoidea, on dead stems of *Epilobium hirsutum*.
Dasyscypha fugiens, on dead rushes.

MYXOMYCETES.

- Stemonites Friesiana*.
Perichæna depressa.
Lycogala epidendron.
Craterium confusum.
Didymium effusum (Link) Rost.

HYPHOMYCETES.

- Botrytis fascicularis*, on *Ulex* stems.

Under the head of marine biology Mr. T. Petch writes : A profitable week-end was spent in exploring the Brig, though more workers were sorely needed. On the Monday, with the assistance of several conchologists and 'unattached' members, mollusca received more attention than on the previous days, and thirty-five species (dead and alive) were observed, including most of those previously recorded.* Some beautiful iridescent *Eumargarita helicina* var. *fasciata* excited general admiration. Egg clusters of various species and the ribbons of *Eolis* were abundant, whilst the enormous numbers of young *Mytilus* contrasted strongly with the scarcity of adults. *Chiton* (*Acanthochites*) *fascicularis* was taken, but *Craspedochilus cinereus* (= *Chiton marginatus*) is the prevailing species.

In crustacea, *Galathea strigosa* was found on the Spittal, nests of *Podocerus* were observed on *Tubularia*, and *Amathilla sabini* was common in the fishing cobles. *Idotea marina* showed marked protective colouration, closely matching the *Fucus* and differing altogether from the grey specimens of the Humber ditches. The usually abundant *Porcellana longicornis* was not seen. Pycnogonids were represented by *Pycnogonum littorale*, and one specimen each of *Phoxichilus spinosus* and *Phoxichilidium coccineum*, but a general order to 'hunt for spiders' failed to produce any further examples of the last two. *Actinia mesembryanthemum* was abundant everywhere, *Tealia crassicornis* was rare on the parts examined, and *Sagartia*, probably *troglodytes*, was fairly common in hollows beneath the *Fucus*. The Hydrozoa, Polyzoa, and worms which were collected have not yet been examined. Particulars of these will be given shortly.

It was disappointing to find such a small attendance of marine zoologists. The idea that this work can only be carried on at exceptionally low tides is quite erroneous ; on the contrary, it may safely be said that in the present state of our knowledge of the fauna and flora of the Yorkshire coast, a visit to Flamborough, Filey, etc., at *any* low tide will reveal some form or habit with which the observer is unacquainted ; and only by the experience and knowledge gained between average tide levels can we profitably utilise the opportunities afforded by exceptional tides.

We are indebted to the photographer, Mr. H. L. Kettle, for permission to reproduce the photograph of some of the members taken at Filey (Plate VIIA), and to Messrs. A. Brown & Sons for the loan of the block on page 242.

T. S.

* 'The Naturalist,' Vol. IX., p. 72.

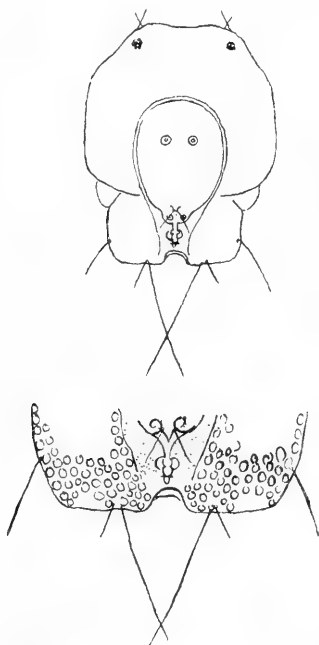
LINCOLNSHIRE FRESHWATER MITES.

C. F. GEORGE, M.R.C.S.,

Kirton-in-Lindsey, Lincolnshire.

Arrhenurus nonforpicatus n.sp. This mite is of a brick-red colour, and is in external anatomy very much like *Arrhenurus forpicatus* Newman. It has the same thick hair-pad on the inner side of the second joint of the palpus; the petiole is also much

the same, but it does not possess the forceps-like formation at the end of the tail so characteristic of *A. forpicatus*. A glance at the figures of the two mites will show clearly what I mean. *A. forpicatus* is a fairly common mite, but I have only met with one specimen of the



***Arrhenurus nonforpicatus* n.sp.**

Upper figure, Dorsal surface.

Lower figure, Tail much magnified.



***Arrhenurus forpicatus* Newman.**

mite I am describing, so that it must be pretty rare. Mr. Soar kindly drew the figures from my specimen. I may say that we have two varieties of *forpicatus*, both fairly common, one a dark green colour, the other red, but

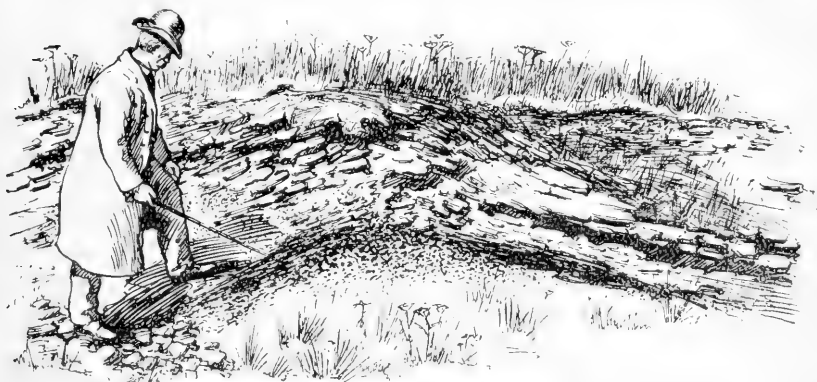
not the same kind of red as *nonforpicatus*. However, colour, though useful, is not always to be relied on; not only does it differ in the same mite at different periods of its life cycle, but mites anatomically alike, differ in colour; in different districts. Such is especially the case with regard to *Diplodontus*, which is usually of a bright scarlet, but in some localities it is of a dirty yellow.

NOTES ON THE GEOLOGY AND ARCHÆOLOGY OF THE CAYTHORPE AND LEADENHAM DISTRICT.

HENRY PRESTON, F.G.S.,

Grantham; President of the Lincolnshire Naturalists' Union.

THE rock formations examined and described during the visit of the Lincolnshire Naturalists' Union to the Grantham district in August 1902 consist of the Lincolnshire Limestone which forms the Cliff Hill; the Northampton Sands and the Upper Lias Clay forming the western slope of the cliff escarpment, and the Marlstone Rock-bed, which is here worked extensively for Ironstone. Samples also were seen of the sandy and micaceous clays of the Middle Lias underlying the Marlstone. The dip of the strata is mainly to the south-east, and the beds



Fold in the Marlstone Rock near Hough Mill, Caythorpe, Lincolnshire.

lie conformably upon each other, save in a case where the Lincolnshire Limestone has a decided dip towards the west in consequence of underground denudation. In this case some springs which issue on the western slope of the escarpment have cut away the Northampton Sands and top beds of Upper Lias and let down the Limestone.* The Ironstone consisted originally of ordinary Limestone, which subsequent depression brought in contact with subterranean water capable of depositing carbonate of iron. An uplift of the rock and denudation then brought these beds to the earth's surface, where carbonated atmospheric water in the form of rain changed the soluble carbonate into the insoluble oxide of iron, in which form it is now worked. Folds and large fissure cracks occur in the

* See Quart. Journ. Geol. Soc., Vol. 59, 1903, pp. 29-32.

Marlstone; the illustration (Fig. 1) shows a good anticlinal fold near Hough Mill, west of Caythorpe, and the sandy clays of the Middle Lias are well-exhibited beneath the bent rock.

Numerous type fossils of the Marlstone can be collected from heaps of road-metal along the Pottergate Road, and these include several interesting examples of *Terebratula punctata*, showing the brachial loop when broken open.

Several fine examples of early British pottery have been dug up in the Ironstone workings. One small 'Incense Cup' of particular interest is illustrated below.



Two Views of 'Incense Cup' found at Caythorpe Ironstone Workings.

It is a thick, coarse, partially baked vessel about $\frac{1}{2}$ inch thick, the internal diameter being 2 inches, and 1 inch deep. With the exception of the inside, it is covered with short, zig-zag lines of ornamentation, the design being made with a pointed stick or similar instrument. Besides the early British urns and other vessels, various Roman and Saxon bronze fibulae and other personal ornaments have been turned up in the workings, many of which are now in the Nottingham Castle Museum.

PIED FLYCATCHER IN YORKSHIRE.

J. BRAIM,
Pickering.

I FIRST made the acquaintance of this interesting little bird in April in the early fifties on a bitterly cold Sunday afternoon.

I noticed a bird drop to the ground, so light, so fluffy, and so unlike any I had seen before that I started from my seat by the fire, rushed to the window, jumping over obstacles on the way, and was in time to see a beautiful male of the above species on the sloppy road.

That stormy night a tragedy happened in the bird-world, and on the following morning I, who until that time had never

Naturalist,

seen a Pied Flycatcher, had the fortune or misfortune to pick up, drowned in a water-tank, one male and three females.

Since this dramatic introduction I have been specially interested in the bird—in its habits and local distribution. I long had the impression that it was a very rare bird, but I find that everywhere in North Yorkshire it may be met with in suitable places. Contrary to the habit of its spotted relative it affects the tops of the highest trees as its hunting ground, but, according to observations I have been able to make, it nests near the ground and never in the higher part of the tree.

On two occasions as I have watched them, lying on my back, a bird has dropped from a great height and tumbled into a hole in a tree within a few yards of where I lay. I say 'tumbled' and 'dropped' advisedly, as these words seem best descriptive of their movements.

In certain positions and lights their white brows do not show, and all that is seen is a little ball of black feathers floating about. This no doubt is the bogie man which the insect mothers point out to keep in order their unruly youngsters.

At such high elevations as the Flycatchers frequent their notes are difficult to identify, the incessant chatter of their lively associates increasing the difficulty; once only have I been sufficiently near to be certain that the bright, lively '*chip*' was from this bird. This sound is quite unlike the soft, swiping, pensive note of the spotted species which on its arrival in spring makes you fancy that you are near fledgling Robins calling to their parents to hurry up with the next meal.

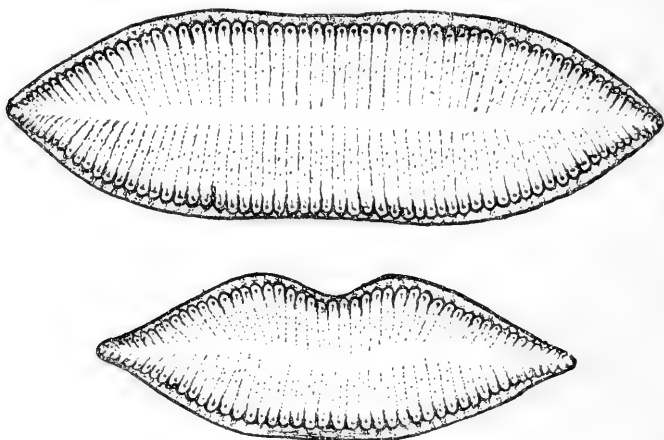
Its distribution in North Yorkshire is most likely co-extensive with the division of the county. At Briggswath, near Whitby, where I first met with it, in the Woodlands, the Carrs, in the Esk Valley; on the Earl of Mulgrave's estate; in Egton, Glaisdale, and Fryup Woods; at Goathland, Newton Dale, Pickering, Kirbymoorside, and Helmsley, where it holds high revel in Duncombe Park. The dales on the Earl of Feversham's splendid estate appear to be specially attractive as breeding grounds. Bilsdale, Farndale, and the smaller dales where tall trees abound are also favourite haunts. Scarborough, on Lord Londesborough's estate; Hackness to Langdale End; Hovingham, Gilling, Newbury Park, Coxwold to Whitestone Cliff, and the lordly domain of Castle Howard are included in its summer homes. It probably is to be found all over Cleveland and in the neighbourhood of Masham.

It would be interesting to many readers of '*The Naturalist*' to have other areas indicated where the Pied Flycatcher breeds.

DIATOMS IN HOTHAM CARRS, NEAR NORTH CAVE.

R. H. PHILIP,
Hull.

ON the occasion of the recent excursion of the Hull Scientific Club to Newport I took a gathering of Diatoms from a ditch in the low-lying country between the Chalk Wolds and the Market Weighton canal, described on the map as Hotham Carrs. On examination under the microscope it was found to consist chiefly of a beautiful form of *Surirella*, figured and described in Peragallo's 'Diatomées Marines de France' as *Surirella medulica* Per. It appears to be a variety of *S. constricta* W.Sm. (*S. Smithii* Ralfs), distinguished from the type form by its straight sides. Peragallo records this variety as found by him



in brackish water at Médoc, a place in the South of France well known to claret drinkers. Van Heurck states that *Surirella Smithii* is recorded for brackish waters in England by Wm. Smith, Combes, and Stolt, and in Ireland by O'Meara. No previous freshwater records appear to be known, yet here we find it abundantly in a ditch at least five miles from the Humber, and in country that has not been overflowed by the tide for at least a century, and probably for much longer. It is interesting to note the survival of a brackish-water form under such conditions. A small percentage of the frustules show a curious distortion caused by an indentation on one side of the valve, as shown in the lower figure. Peragallo's plates show similarly distorted forms of *Surirella* labelled as distinct species, *S. reniformis* Grun. being a distortion of *S. gemma* Ehr., and *S. Neimeyeri* Jan. of *S. fastuosa* Ehr.



Cliffs near Gristhorpe.

REVIEWS AND BOOK NOTICES.

Geological Rambles in East Yorkshire, by Thomas Sheppard, F.G.S. A. Brown & Sons, Ltd., Hull.

The energetic Hon. Secretary of the Yorkshire Naturalists' Union here gives us a work of very high interest and value. Yorkshire is a county in which there is room for much rambling, and though it contains more acres than there are letters in the Bible, there is hardly an acre from which the well-instructed and alert intelligence may not gather food for pleasant thought and lessons helpful to his growth in knowledge. Especially from the rocks and soils ranging in date from the Palæozoic to the Pleistocene, here carved into bluff coast-cliffs, faulted it may be and contorted, there rising into mountains or spread out as



Sanwick Nab.

a carpet of tenacious clay or friable loam, may we gather lessons that will minister at once to our pleasure and our profit.

But we need a guide or we shall wander on, missing both of these. Now Mr. Sheppard offers himself as a guide, and he is unquestionably a guide of the right sort. For such purposes there are two species of guides to be specially eschewed. There is the man who does not rightly know the subject on which he presumes to instruct us. His knowledge has been out of date for the last ten years—a small space of time in geology, but an enormous period in our *knowledge* of geology at the present rate of progress. And then there is the man whose knowledge is

all right, but who cannot get it out of him in such a way as to benefit us. It comes out in the form of awful polysyllabic words which belong to a language of which we know nothing, and which therefore repel us, and convey to us no meaning. Most of our would-be guides belong to one or other of these two classes. Mr. Sheppard does not. He knows his Yorkshire and he knows his geology. His knowlege is well up-to-date, and he does not employ *verba sesquipedalia* when a monosyllable will equally well serve his turn. He starts from the Spurn and takes us right round the coast to Redcar, gossiping pleasantly the while regarding the 'solid' geology, and the geology which is not solid. Then he takes us back to the mouth of the Humber and thence to the top of the Wolds, from which, having learnt all about them, we wander back into Holderness, and finish at Paull, which is doubtless a nice quiet place at which to rest after so long a ramble. And a rest we shall surely want, because not only will our minds be full to overflowing with hard facts needing digestion, but our bags will be full of fossils and fragments of 'travelled rocks'—the planets of the geological world—which migrated ages ago, as though seeking a more congenial climate, from Scandinavia or the Scotch or Cumbrian mountains.

There is not a dull page in Mr. Sheppard's book, which, by the way, contains some 250 pages with over 50 illustrations in the best style, a geologically coloured map of the district, and a full index. As we read the author's accounts of recent discoveries in the area with which he deals, we feel that though there is no assertion of the *quorum pars magna fui* yet his own geological work in the area has been of considerable importance. Doubtless in the future he will, by original investigation, help on the geological knowlege of the district of East Yorkshire, but possibly in this respect he will do nothing more effective than he has done in writing the work before us, for we trust that it will whet the appetite of many a tyro for knowledge of the earth's crust and of the successive changes which it has undergone, and that the stimulus received from it will result in the production of a large band of intelligent and enthusiastic workers to add their labours to those of that body of Yorkshire geologists which is now far in advance of any similar body in any other county. The book ought to find its way into the hands of everyone who spends a holiday on the Yorkshire coast, while it is still more interesting to all who dwell in East Yorkshire. It will form an admirable companion for both classes of readers.

We only venture to make one criticism. We should have liked to have seen the nomenclature of the fossils brought more completely up-to-date. But we feel sure that a second edition will soon be called for, which may be even better than the first. But the book as it stands will be as valuable and indispensable to the learned geologist visiting the locality as to the general reader who makes his first acquaintance with geological science by a perusal of its pages.

For the specimen illustration and plate we are indebted to the publishers.

J. H.

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The Victoria History of the Counties of England.—Northamptonshire.—Entomology. Archibald Constable & Co. Limited.

We have received the Entomological portion of another of these county histories, which, like the two already noticed in this journal, is edited by Mr. Herbert Goss, F.L.S., Secretary to the Entomological Society of London. Compared with the two previous histories (Hampshire and Surrey), one cannot help noticing the meagreness of this list, which shows clearly how little is yet known of the insect fauna of Northamptonshire. The only order, indeed, which seems to have been fairly well worked is the Lepidoptera, and that only applies to the 'Macros,' the 'Micros' having evidently been almost neglected. We notice, indeed, the entire absence from the list of three species which we took ourselves at Barnwell Wold in June 1881, and which were duly recorded in the 'Entomologist's Monthly Magazine,' and certainly ought not to have been overlooked. We allude to *Nola cristulalis*, *Botys lanceolalis*, and *Pterophorus galactodactylus*, the first and last of which were tolerably common. The part is got up in the same admirable manner as its predecessors, under the same editorship; but its chief use should be as a stimulus to the local entomologist to remove the reproach from a county which, from our own experience and knowledge, must be a productive area in this branch of its natural history.—G. T. P.

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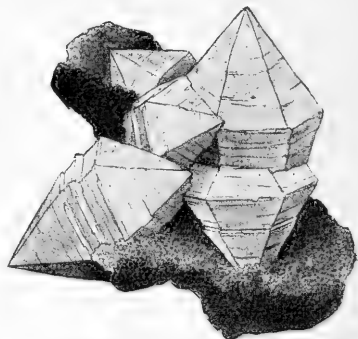
Nature Studies (Plant Life), by G. F. Scott Elliott. Crown 8vo., pp. vii. + 352. Blackie & Son. 3s. 6d.

The author states that 'this book is written with a view of helping those non-professional lovers of 'Nature Study' who are really interested in the mystery of plant life.' To such the book will not only be helpful but stimulating, and will suggest to them many new lines of thought and work. It will also be found useful for the professional nature student, who often is not really interested in the mysteries of plant life, but if he were to read carefully through these pages, and use his eyes aright, could not fail to become interested. The work is illustrated by numerous diagrams, usually very clear and striking, also several from photographs. Bionomics is its dominant feature, and in this respect reminds us of several with which American botanists have recently made us familiar. Field botanists, wishing to become acquainted with the numerous biological problems necessary for successful survey work, will find here much of value. Teachers too will obtain many hints from its pages which will serve to fill with interest the dry morphological details of many text books. It is essentially an account of living things as distinct from a mere glossary. We can heartily recommend the work to all students who wish to widen their conceptions of plant life. The author has had considerable experience as traveller, collector, and teacher, and although at times speculative, we can generally rely on his version of the facts. Unfortunately, he has attempted to cover a very wide field, and consequently several important features have been summarily dealt with.

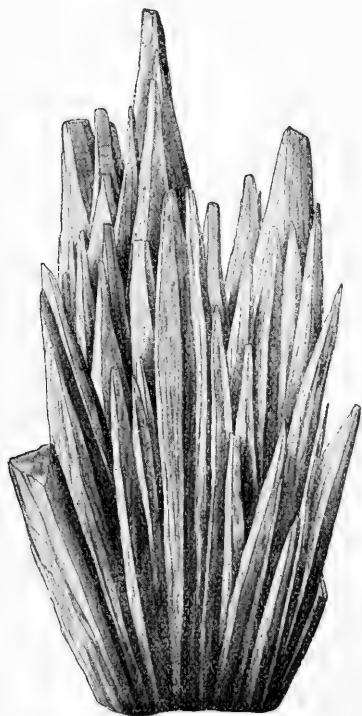
Mineralogy: an Introduction to the Scientific Study of Minerals.

By **Henry A. Miers, D.Sc., M.A., F.R.S.,** etc. 8vo., pp. xviii. + 585; with two coloured plates and 716 illustrations in the text. London: Macmillan & Co. 1902. Price 25s.

In this handsome volume Professor Miers offers to the student of mineralogy a text-book of a kind which has long been a desideratum, and we do not doubt that it will be heartily welcomed by students and teachers alike. The author points out in his preface that certain important branches of mineralogy, viz., those dealing with the origin, occurrence, associations, and geological relations of minerals, have been excluded; and accounts for their omission by the consideration that they are of sufficient magnitude to deserve a separate volume. We hope that we may regard this not merely as an apology, but as a promise. Apart from this the work is admirable as a text-book almost



Witherite from Hexham.



Aragonite from Cumberland.

as much for what it omits as for what it includes. The judgment shown in this respect marks it as the production of one who is a successful teacher no less than a practised mineralogist.

The principal bulk of the volume divides into two nearly equal parts; the one devoted to the properties of minerals in general, the other dealing with the more important mineral species severally. The general part begins with a discussion of crystalline form and an account of the six crystallographic systems, and proceeds to the conjunctions of crystals, twinning, vicinal faces, and the measurement of crystals on the goniometer. This covers the geometrical properties of crystals. The next section treats of the crystallophysical properties, such as elasticity, cohesion, etc., and especially the optical characters. These are described lucidly and sufficiently fully, the author preferring to make use of the 'indicatrix,' though he does not entirely discard Fresnel's ellipsoid. There remains those properties, such as specific gravity and specific heat, which are not specially related to crystal form, and the chemical properties of minerals, of which a useful summary is given. Particularly acceptable is the chapter devoted to isomorphism, vicarious replacement, etc., containing much material which the student

Naturalist,

will be glad to have in a collected form. This general part of the book concludes with chapters on the description and determination of minerals; but there are two appendices, one on the thirty-two classes of crystals and the other, rather tantalising in its brevity, on theories of crystal-structure.

In the second part of the work the author has constantly borne in mind the difference between a text-book and a book of reference, and has judiciously abstained from hampering the accounts of the several minerals with a mass of details which no student could hope to remember. Thus, instead of a long list of localities for each species, we have two or three, with some note of the mode of occurrence of the mineral in each case. There is further a due proportion observed in the prominence given to the several minerals, and the relationship subsisting between different species are clearly brought out. A number of tables appended to the volume will be found of great value in the discrimination of minerals by measurable properties. They include tables of mean refractive index, of birefringence, of optic axial angle, and of specific gravity, the minerals being arranged in each case according to the property specified.

The book is well illustrated throughout. A new and admirable feature is a number of shaded drawings of actual crystals or groups of crystals, examples of which we are permitted to give here. Another interesting illustration is a coloured plate of the interference-figure of a section of orthoclase printed by the three-colour collotype process.—A. H.



Country Rambles. By **W. Percival Westell.** London: H. J. Drane. 1903. 10s. 6d. This work is apparently a verbatim reproduction of the author's diary, kept during the year 1900. It contains entries for every day in the year, which have reference principally to Hertfordshire. The notes are chiefly ornithological, though, on dates when nothing unusual has turned up, references to the weather, or the absence of certain birds, etc., are included. A great number of the entries are of a very trifling character, and make the perusal of even a few pages very irritating—'Lovely day. Most birds singing.' 'I was tempted out in the garden early by the brilliant sunshine, and did a bit of gardening,' etc., etc. The book is exceptionally well illustrated by photographs and drawings, the former being usually very good, though it is difficult to see in what way some are connected with the work. The numerous photographs illustrating various phases of bird life are particularly interesting. Photographs of the Punjaub Wild Sheep, Ibex, Tiger, etc., were rather unexpected, but apparently are the result of a visit made by the author to the Zoo. The book has the advantage of an index, from which it appears that some of the commoner birds, etc., have been referred to an enormous number of times—in one instance over a third of the number of daily entries. On looking them up we find usually the bare statement that the bird was, or was not, seen or heard. 'Country Rambles' is evidently the work of an enthusiast, who must be congratulated on having kept so complete a diary, and on having it published.



Part 29 of the Transactions of the Yorkshire Naturalists' Union, issued (together with Part 28) to the members for 1902, has been published. It contains the Rev. W. Fowler's presidential address for 1901, the 40th and 41st Annual Reports of the Union and lists of members, Reports of the Soppit Memorial Committee, and reprints of the 1901 and 1902 excursion programmes. It can be obtained from the Secretary of the Y.N.U. at the Museum, Hull. The price to non-members is one shilling.



The Birmingham and Midland Institute Scientific Society has issued a most valuable volume of 'Records of Meteorological Observations taken at the Observatory, Edgbaston, 1902,' by Mr. A. Creswell. Price 2s. The volume contains numerous charts.

FIELD NOTES.

BIRDS.

Bullfinch near Horncastle.—A remarkable feature in this neighbourhood in recent weeks has been the great number of Bullfinches (*Pyrrhula europæa*). I have sometimes seen from 20 to 30 in the hedgerows during a walk of a couple of miles.—J. CONWAY WALTER, Langton Rectory, 13th March 1903.

Woodchat Shrike at Speeton.—On Saturday, 9th May, I saw a fine male Woodchat Shrike (*Lanius pomeranus*) among the furze bushes on the broken ground on what is known as the Speeton Middle Cliff. I was sitting at the time, and the bird came and perched on the top of a bush some twenty paces off. Having often seen this easily-recognisable Shrike in other localities (out of England) I think that I can hardly have made a mistake in my identification of this somewhat rare species.—C. G. DANFORD, Reighton.

Lincolnshire Bird Notes.—On 17th May 1902 I and my son Dennis put a Corn-Bunting (*Miliaria miliaria*) off her nest under a bush in a ditch by the road from Kirton Lindsey to Redbourne. The nest contained three half-incubated eggs. On the 13th May this year we found another nest in the same place which also contained three slightly-incubated eggs. It is not likely that either season eggs had been taken from the nest, which is well away from any village. We should not have discovered it had we not been studying a form of the variety *albo-fasciata* of *Helix aspersa* which occurs in the broken Lincolnshire Limestone bed in the ditch at the spot. Three eggs two years running is exceptionable. In Redbourne we saw two pairs of Whinchats (*Pratincola rubetra*), which are not nearly as common as in the late sixties and early seventies.—E. ADRIAN WOODRUFFE PEACOCK, Cadney, Brigg.

MOLLUSCS.

Snails on Roof of Bridlington Priory Tower.—When our Driffield Naturalist Club was visiting Bridlington Priory on Saturday, 2nd May 1903, a boy of the party secured at least a dozen *Hygrania hispida* of varying sizes which he had found at the top of the very high tower. Unfortunately they were all dead specimens. Probably the wild winter had been too much for them. They were in a fair state of preservation considering their position and exposure.—E. P. BLACKBURN, Driffield.

***Amphipeplea glutinosa* at Tetney, Lincolnshire.**—*Amphipeplea glutinosa* has once been recorded for Lincolnshire, namely, in 'The Naturalist,' 1894, p. 68, where mention is made of a single specimen found floating seawards with the water of the Mar Dyke at Saltfleetby All Saints. The object of the present note is to record the existence of a considerable assemblage of this curious and beautiful Pulmonate at Tetney, where it was found by Mr. C. S. Carter and the writer on 17th April 1902. It occurred in a drain of good size by the left of the road running from the village to the lock (by the right of the road at this place is the great Tetney Drain); here it was creeping on the mud in good numbers, and was far more plentiful than *Limnæa pereger*, *L. stagnalis*, etc., which occurred with it. In July of the same year, when the locality was visited by Mr. Carter and Mr. G. K. Gude, F.Z.S., only two or three young individuals and a few dead shells were found; and fears were entertained as to the permanence of the colony. In April last, however, when Mr. Carter, Mr. Roebuck, and the writer were at Tetney, the animal was again found in all its former abundance, in various stages of growth, and inhabiting the drain as before for a distance of about 150 yards. Among the plants of the place is the curious Bladderwort (*Utricularia vulgaris*), and in summer the proud heads of *Butomus umbellatus* stand high above the water.—H. WALLIS KEW, London, 25th May 1903.

***Sphærium corneum* on the Toes of Toads.**—On 17th April 1902, the day of the finding of *Amphipeplea* as above noted, Toads were plentiful in the drains at Tetney; and we secured five, to the toes of the hind feet of which individuals of *Sphærium corneum* were firmly affixed. Four carried one shell each, while the fifth, a small toad, had two full-sized shells on the toes of the same foot. The molluscs—conspicuous in this position through the clear water on a dark bottom—were clinging with great tenacity, as usual in such cases, by closure of the valves of the shell, between which no doubt the toads had accidentally intruded their toes. Occurrences of this kind, as the reader will probably remember, have several times been recorded, this same *Sphærium corneum* having been found attached not only to the toes of Toads, but also to those of Frogs, Newts, a Snipe, the Great Water-Beetle (*Dytiscus*), the Water-Scorpion (*Nepa*), and the larva of a Dragon Fly.—H. WALLIS KEW, London, 25th May 1903.

LEPIDOPTERA.

Cleveland Lepidoptera.—On 5th July 1902 I took a few specimens of *Aspilates strigillaria*, hitherto unrecorded for the district, on the heathery slopes of the great glacial overflow valley, Ewe Crag Slack, Danby. Two or three larvæ of *Agrotis agathina* were noted on Ingleby Moor on 21st June. I found three fine specimens of *Selenia lunaria* at rest on grass-stalks in hedges at Ingleby, Ayton, and Acklam during June, and as illustrating the backward season *Hepialus humuli* was on the wing, in Middlesbrough Park, on 18th August, my previous latest date being 5th July 1899. On the few occasions I went sugaring hardly anything turned up.—FRANK ELGEE, Middlesbrough, 28th April 1903.

***Liparis salicis* near Selby.**—When collecting at Bishop's Wood, with the Rev. C. D. Ash, of Skipwith, on Saturday, 6th June, we picked off several larvæ of *Liparis salicis* from poplar. I know of no previous record of its occurrence there, though with so much poplar in the wood it is natural enough to expect it. On the other hand, the wood has been so well worked for probably forty years or more, it would be strange for so conspicuous a species to have been missed for so long if it existed. There is an old record for the species at Selby (1864), but I know of no other for the vicinity until this.—GEO. T. PORRITT, Huddersfield, 8th June 1903.

**COLEOPTERA.**

***Otiorhynchus muscorum* Bris. near Carlisle.**—On 28th March this year I took a single specimen of this Weevil from moss growing in a hedge bottom about three miles from this city, and a week later a supplementary pair in the same locality. This is a new record for Cumberland.—JAS. MURRAY, Carlisle, 27th May 1903.

**FLOWERING PLANTS.**

Botanical Notes at Grantham.—On the occasion of the excursion of the Lincolnshire Naturalists' Union to Grantham, 30th July 1902, a full list of the flora was taken as usual, but it was rather disappointing, for *Trigonella purpurascius* and *Hypochaeris maculata*, two of the rarest species of this neighbourhood, were not seen. *Thesium*, however, was flourishing on the old spot on the High Dyke at Fulbeck. *Silene noctiflora* was rather out of place at Caythorpe on the limestone, and must

have been brought with seed. *Astragalus danicus* and *Hippocrepis comosa* were all along the 'old street.' *Saxifraga tridactylites* only in one spot. *Caucalis nodosa* at Hall's Hill, Grantham, and *C. arvensis* at Little Ponton. *Gallium mullugo* at Fulbeck. *Asperula cynanchica* all along the High Dyke. *Artemisia vulgaris* at Leadenham. *Cnicus acaulis* × *arvensis* on High Dyke. *Serratula tinctoria*, type, near Byard's Leap. A pale lilac form of *Centaurea Scabiosa* was taken by Mr. F. M. Burton, probably in Fulbeck parish. *Specularia* was common in cornfields. *Lithospermum arvense* at Fulbeck. *Hyoscyamus* on waste ground at Caythorpe Station; *Calamintha clinopodium* at Caythorpe, along with *C. arvensis*, and the *flore albo* form at Byard's Leap. *Galeopsis Tetrahit*, and the form *flore-albo*, both on escarpments between Caythorpe Station and 'The Court.' *Lamium amplexicaule*, both the long and short corolla forms, on the High Dyke, Fulbeck. The subacute-leaved form of *Rumex obtusifolius* between Leadenham and Fulbeck. *Parietaria* in Caythorpe village. A curious form of *Juncus acutiflorus*, procumbent and rooting at the nodes was found on the bank of a pond near Caythorpe Station, along with *Alopecurus geniculatus*. *Koeleria*, *Festuca rigida*, and *Bromus erectus* on the High Dyke.—E. A. WOODRUFFE PEACOCK, Cadney, Sept. 1902.

MOSESSES.

Mosses at Grantham.—Very few mosses were taken on the occasion of the Lincolnshire Naturalists' visit to Grantham in July 1902, owing to the dry weather and somewhat hurried round; nevertheless one turned up, new to Div. 13, viz., *Encalypta streptocarpa*, on the High Dyke. The district is a good one for mosses; ninety species have been taken in Caythorpe parish alone. The following is a short selection:—*Ditrichum flexicaule* Hpe. *Barbula rubella* Mitt. *Butophacea* and *Camptothecium lutescens* B.&S., limestone pits. *Tortula pusilla* Mitt., *T. lamellata* Ldb., *T. ambigua* Ångstr. *Bryum argenteum* var. *lanatum* B.&S., mud capped walls. *Orthotrichum saxatile* Milde, stone walls. *Zygodon aridissimus* R.Br. *Leucodon sciuroides* Schwgr. *Tortula papillosa* Wils., *T. mutica* Ldb., on trees. *Weisia crispa* Mitt. *Pottia minutula* Fűr., *P. bryoides* Mitt. *Fissidens exilis* Hedw., in thin pastures. *Pottia lanceolata* C.M. *Eurhynchium crassinervium* B.&S., *E. Swartzii* Hobk. *Hypnum chrysophyllum* Brid. *Climacium dendroides* W.&M., banks and pastures.—S. C. STOW, Grantham, Sept. 1902.

CARBONIFEROUS VEGETATION AT BRADFORD.

W. CUDWORTH,
Bradford.

IN consequence of the energy of the members of its various scientific societies, the neighbourhood of Bradford is being carefully 'worked,' especially as regards its geological features. To students of geology the immediate district affords ample opportunity for research owing to the diversity of its physical features. It is especially rich in the flora of the Carboniferous



Fossil Tree at Bradford.

period, and many examples of the fossil tree (*Sigillaria*) and its connected roots (*Stigmaria*) have been unearthed. A well-known example of this type was discovered at Clayton, two miles from Bradford, some years ago, and was secured by Professor Williamson for Owens College, Manchester. Its diameter was 3 feet 9 inches; the circumference of the largest root, near the trunk, 6 feet 6 inches. One root had a length of about 16 feet, and the ramifications of the various root branches spread over an area of about 90 feet. This specimen, however, is but one

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of many found in the Bradford area. Each of the five public parks possesses an example. The most recent discovery of this kind forms the subject of the illustration, and was laid bare in excavating for an extension of the Rawson Place Provision Market, which is in the heart of Bradford. The specimen was photographed in situ, but has since been removed to Peel Park, Bradford. The upright trunk, as usual, had been denuded. The diameter of the portion of the trunk remaining is about two feet. The largest root is 15 ft. 6 in. long, another is 13 ft. 4 in., and there are two forks of smaller dimensions. The thickness of the two roots nearest the trunk is 1 ft. 5 in. and 1 ft. 3 in. respectively, the other roots falling away to 9 inches, 7 inches, and less.

The fossil was found at a depth of 16 feet, and occurred under about 8 feet of impure sandstone. It rested upon the well-known Elland flagstone. The exigencies of the situation prevented the ramifications of the roots being followed on the north side.

On the lower floor (upon which the gentleman in the illustration is standing) were well-defined ripple marks.

Within two hundred yards of this place, no fewer than seven similar fossil trees were found a few years ago, the stumps varying in size from 1 ft. 6 in. to 2 ft. 6 in. in diameter.

AMPHIBIA.

Newts in Cumberland, 1705.—I have no proof that the words in italics below really represent newts, but as in 1705 it is probable that the bait employed would be either minnows or other small fry or worms, which newts readily take, I give the record here as for newts.

A question in 'Notes and Queries' was answered by Lord Aldenham by a suggestion that the words were a mis-reading of water-evett, which, in his lordship's early schoolboy days in Somersetshire, was used for the 'water-lizard' ('Notes and Queries, 6th June 1903, p. 451).

Bishop Nicholson writes in his diary:—'June 18 (1705). Munday.—Early to meet Mr. Gibbon at W. Gasgarth's: whence we went to Threlkeld Tarn, to fish (as it prov'd) for nothing but *Water-Emmets*, no fish being ever known to live in y' cold Lake.' Nicholson's Diaries III., *Trans. Cumb. and Westm. Antiq. and Archeol. Soc., N.S. III.*, p. 14 (1903).—S. L. PETTY, Ulverston, 6th June 1903.

NORTHERN NEWS.

The third Field Day of the Durham County Naturalists' Union will be held in Upper Weardale on 11th July, in connection with which an interesting programme has been arranged.

A new British *Vitrea* (*V. rogersi*) is described by Mr. B. B. Woodward in the April number of the 'Journal of Conchology.' It is from Cheshire, and named after the late Mr. T. Rogers, of Manchester, who first found British specimens in 1870.

The annual meeting of the Barrow Naturalists' Field Club was held in April. From the report sent to us the society appears to be in an exceptionally flourishing condition. The membership is now nearly 300, no fewer than 90 new members having been elected during the year. Mr. Harper Gaythorpe, who has done so much for the society, was re-elected President.

Messrs. W. West and G. S. West have sent us a copy of their excellent 'Notes on Freshwater Algæ.—III.,' reprinted from the 'Journal of Botany,' which includes several northern county records. The paper is accompanied by three plates, in which the following species of interest to our readers are figured:—*Conferva affinis* Kutz (Yorkshire and the Lake District); *Chlorobotrys regularis* West (generally distributed through British *Sphagnum*-bogs), and *Ineffigiata neglecta* West and G. S. West.

The annual report of the Halifax Scientific Society indicates that the society continues to do useful work. An increase in the membership and attendances at the meetings is recorded. It is suggested that the society should issue 'Annual Transactions' in place of the 'Halifax Naturalist,' which has now been issued for seven years.

From the reports of various Yorkshire natural history societies to hand it is pleasing to note to what a large extent the Yorkshire Naturalists' Union Winter Lecture Scheme has been taken advantage of. Whilst they have not been of great advantage to the Union, directly, there is no doubt that the societies have benefited.

The Bradford Scientific Association has made a new departure in its work by appointing sections for definite study during the summer months. These are under the leadership of capable men and no doubt good will come of the venture.

'The Report on the Eruptions of the Soufrière, in St. Vincent, in 1902, and on A Visit to Montagne Pelée, in Martinique.' Part I., by Dr. Tempest Anderson and Dr. J. S. Flett, has been issued by the Royal Society (Phil. Trans. A., Vol. 200, 1903, pp. 353-553, plates 21-39).

Mr. J. Beanland, of 7, Oulton Terrace, Horton Road, Bradford, asks for any information about G. P. Nicholson, a botanist who collected and exchanged a large number of Yorkshire plants between the years 1823 and 1834. He has recently seen Nicholson's herbarium, which is in an excellent state, in bound volumes, and contains many of the very best Yorkshire plants, viz., *Hutchinsia petraea*, *Sedum villosum*, *Scheuchzeria palustris*, *Cypripedium calceolus*, *Aspidium lonchitis*, etc., etc. His correspondents include Tatham, Hooker, Rev. — Harriman, Rev. — Wilson, and Thompson.

The title of the 'Manchester Geological Society' has been altered to 'The Manchester Geological and Mining Society.'

The Leicester Literary and Philosophical Society visited Scarborough for Whitsuntide, and an admirable pamphlet of 'Descriptive Remarks,' by C. Fox-Strangways, was issued in connection with the excursion.

The 73rd meeting of the British Association will be held at Southport from Wednesday, 9th September 1903. The president-elect is Sir Norman Lockyer, K.C.B., F.R.S. Professor W. W. Watts, M.A., is the president of the Geological Section, and Mr. A. C. Seward, M.A., F.R.S., is president of the Botanical Section.

DURHAM DIPTERA.

REV. W. J. WINGATE,

St. Peter's Vicarage, Bishop Auckland.

ABOUT six or seven years ago, when old Natural History tastes had been revived by country residence after years of town work, I thought how stupid it was not to know anything about the common flies which crowded the windows in summer. So I turned my attention to the Diptera, and since then I have been collecting in the county of Durham only. The following, comprising 559 species and varieties, are those I have caught and been able to identify with reasonable certainty up to the present. Of course there are many more not yet identified. Several which puzzled me have been named or checked by experienced dipterists, and I have especially to thank Mr. Austen, Col. Yerbury, Mr. Collin, Mr. Henderson, Mr. Wainwright, Herr P. Stein, and Mr. Grimshaw for their kind help from time to time. I am sending all the specimens to the Newcastle Museum to form the nucleus of a collection of the Diptera of Durham and Northumberland. I shall be glad to help to the best of my ability any beginner taking up the study of the Diptera. Begin young. I wish I had begun younger. But better late than never, only—begin. I would like to have one fellow worker at least in the two counties.

I should also be greatly obliged if any Durham entomologists, collecting in other orders, would send me any peculiar Diptera that they may catch, or that, to their disgust, may appear in their breeding cages. I have already received several Tachinidæ, which I have not seen on the wing, from an enthusiastic local lepidopterist, Mr. Greenwell. But I do not want Ichneumons or anything except two-winged flies.

My collecting has been chiefly in two localities—one inland—round Bishop Auckland and up Weardale, and one near the sea. The following is the character of the different localities:—

LOCALITIES.

NORTH DURHAM. *Gibside*, 100-400 ft. Wooded estate on the Derwent, about 7 miles south-west of Newcastle. *Marley Hill*, 500-700 ft. On the ridge east of Gibside; rather bare colliery district.

SOUTH DURHAM. An interrupted strip 4-12 miles broad along the southern border. Beginning from the sea: (1) *Hesleden*.

Shore, flowery sea banks, sandhills, wooded dene, and farm land, about 3 miles north of Hartlepool. Collected mostly during the holiday month of August. Gap of about 16 miles not examined except at Wynyard. (2) *Bishop Auckland*, 350 ft.—Practically the small plot of ground round this vicarage. (3) *Belburn*, 350 ft.—Strip of wood and stream below Auckland. (4) *Escomb*, 350 ft.—Wooded Wear banks above Auckland. (5) *Evenwood*. (6) *Gibsones*. (7) *Raby*. (8) *Barnard Castle*.—Wooded river banks and parks 300-500 ft.—South of Auckland. (9) *Harperley*, 400 ft.—Wooded Wear banks. (10) *Shipley*, 400-700 ft.—Wooded glen with bog at the top. (11) *Shull*, 600-900 ft.—Pine woods with streams. (12) *Bollihope*, 700-900 ft.—A dale running into Weardale. (13) *Stanhope*, 700-900 ft.—Wooded dene. (14) *Waskerley*, 700-1,300 ft.—Wooded glen and moorland. (15) *Wearhead*, 1,000-1,500 ft.—High dales and moors. All from 2 to 15 except 7 and 8 are in Weardale and its tributaries.

ARRANGEMENT.—This is founded on Mr. Verrall's 'List of British Diptera,' second edition, the appearance of which some time ago was most welcome.

I have added a few notes on certain species to which the asterisk calls attention.

Fam. *MYCETOPHILIDÆ.

Mycetophila punctata Mg. Common.

Mycetophila cingulum Mg. Bishop Auckland, window, two ♀s, Oct.-Nov. 1901.

Glaphyroptera fascipennis Mg. Bishop Auckland, one ♀, Sept. 1900.

Lasiosoma hirtum Mg. Bishop Auckland, two ♂s, May 1900.

Sciophila ornata Mg. Shull, one ♀, September 1900.

Macrocera fasciata Mg. Gibside. one ♀; Bishop Auckland, one ♀, July 1900.

Bolitophila fusca Mg. Stanhope, one ♀, May 1900.

Bolitophila cinerea Mg. Bishop Auckland, one ♂ and one ♀, May 1900; Harperley, one ♂, June 1900.

Fam. BIBIONIDÆ.

Scatopse notata L. Bishop Auckland, six ♂. May 1900; Hesleden, one ♂, Aug. 1900.

Scatopse brevicornis Mg. Hesleden, one ♂, Aug. 1900.

Dilophus febrilis L. Hesleden, Bishop Auckland, Evenwood, Bollihope, Wearhead, one ♂ each, June-Aug. 1897-1901.

**Dilophus femoratus* Mg. Bishop Auckland, one ♀; Evenwood, one ♀, June 1897.

Bibio pomonæ F. Shull, two ♂s, Sept. 1900; Wearhead, three ♂s, Aug. 1901; Harperley, one ♀, July 1900.

Bibio marci L. Escomb, eight ♂s and one ♀, May 1897; Evenwood, one ♀, April 1897; Bishop Auckland, one ♀, Oct. 1900.

Bibio laniger Mg. Belburn, eight ♂s and two ♀s, May 1900; Shull, one ♂, 1901; Harperley, one ♂ and one ♀, June 1900; Escomb, one ♀, May 1899.

Bibio johannis L. Witton, one ♂; Escomb, one ♂, April 1898; Belburn, four ♂s and three ♀s, May 1899; Gibsonees, one ♂, June 1899; Harperley, one ♂, June 1900; Hesleden, three ♂s and three ♀s, April 1901.

Fam. SIMULIDÆ.

Simulium reptans L. Hesleden, eighteen ♀s, April 1901.

Simulium latipes Mg. Bishop Auckland, one ♂, Nov. 1900; one ♀, May 1902.

Fam. CHIRONOMIDÆ.

Chironomus plumosus L. Common.

Chironomus annularis Deg. Hesleden, one ♂, Aug. 1900; Harperley, three ♂s, May 1899.

Chironomus flaveolus Mg. Bishop Auckland, one ♀, July 1900.

Chironomus pedellus Deg. South Durham, two ♂s.

Chironomus brevitibialis Ztt. Bishop Auckland, one ♂ and one ♀, May 1900.

Chironomus pictulus Mg. Bishop Auckland, one ♂, May 1902.

Chironomus nubeculosus Mg. Bishop Auckland, two ♀s and three ♂s, May 1902.

Cricotopus tremulus L. Escomb, one ♂ and one ♀, June 1899; Bishop Auckland, one ♀, June 1897.

Cricotopus bicinctus Mg. Bishop Auckland, two ♂s and nine ♀s, May-June 1897-1900.

Cricotopus annulipes Mg. Bishop Auckland, one ♂ and seven ♀s, May 1900; Escomb, one ♂, June 1899.

Cricotopus sylvestris F. Bishop Auckland, five ♂s and four ♀s, April 1902.

***Orthocladus dolens** Wlk. Gibside, eight ♂s and one ♀, April 1898.

Orthocladus stereorarius Mg. Gibside, one ♂, April 1898; Bishop Auckland, one ♂, May 1900; Hesleden, three ♂s, Aug. 1900.

Tanytarsus tenuis Mg. Bishop Auckland, one ♂ and three ♀s, April, May, and Oct. 1897-1900.

Tanytarsus flavipes. Gibside, three ♂s and two ♀s, April 1898; Bishop Auckland, one ♂, April 1898; Harperley, four ♂s, May 1899.

Metriocnemus fuscipes Mg. Bishop Auckland, nine ♂s and one ♀, March 1903.

Tanypus varius. Hesleden, one ♂, April 1901; one ♀, Aug. 1900.

Tanypus nebulosus Mg. Hesleden, one ♀, Aug. 1900; Bishop Auckland, three ♂s, Sept. 1902.

Tanypus choreus. Hesleden, one ♂, Aug. 1900.

Tanypus carneus. Bishop Auckland, one ♀, May 1897.

Tanypus melanops Mg. Belburn, one ♂, May 1900.

Fam. CULICIDÆ.

Culex nemorosus Mg. Bishop Auckland, one ♀, July 1900.

Culex pipiens L. Bishop Auckland, one ♂ and two ♀s, Jan.-Nov. 1900-1902; Hesleden, one ♀, April 1901.

Culex ciliaris L. Bishop Auckland, one ♂ and one ♀, May and Aug. 1900.

Fam. DIXIDÆ.

Dixa aprilina Mg. Gibside, one ♂, April 1898.

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Fam. PTYCHOPTERIDÆ.

Ptychoptera contaminata L. Hesleden, one ♂, Aug. 1899; Waskerley, one ♂, April 1901.

Ptychoptera lacustris Mg. Bedburn, one ♀, July 1902.

Ptychoptera albimana F. South Durham, three ♂s, 1899.

Ptychoptera scutellaris Mg. Bishop Auckland, one ♂, June 1902.

Fam. LIMNOBIDÆ.

Limnobia quadrinotata Mg. Gibside, one ♂.

Limnobia nubeculosa Mg. Bishop Auckland, one ♂ and one ♀, May 1900; Harperley, one ♂, June 1900; Raby, three ♂s and two ♀s, May 1901; Barnard Castle, one ♀, June 1901.

Limnobia flavipes F. Shipley, one ♂, April 1898; Hesleden, one ♂ and two ♀s, June 1902.

Limnobia tripunctata F. Shipley, one ♂, April 1898; Hesleden, one ♂ and two ♀s, Aug.; Bishop Auckland, two ♂s and two ♀s, June 1902.

Limnobia trivitta Schm. Hesleden, four ♂s and four ♀s, Aug. 1901.

Dicranomyia modesta Mg. Bishop Auckland, one ♂ and one ♀, June 1902.

Dicranomyia chorea Mg. Common everywhere.

Dicranomyia dumetorum Mg. Hesleden, two ♂s and one ♀, Aug. 1902.

Rhiphidia maculata Mg. Bishop Auckland, two ♂s and one ♀; Shull, one ♂; Raby, one ♀; Wearhead, one ♀, June-Sept. 1897-1901.

Antocha opalizans O.Sack. Bishop Auckland, one ♂, June 1902.

Empeda flava Schum. Bishop Auckland, one ♂, June 1902.

Empeda nubila Schum. Bishop Auckland, two ♂s and two ♀s, May 1902.

Gonomyia, apparently two species, possibly *tenella* Mg. and *scutellata* Egg. Hesleden, ♂s and ♀s, Aug. 1902.

Acyphona maculata Mg. Hesleden, one ♂ and one ♀, Aug. 1902.

Molophilus appendiculatus Staeg. Bishop Auckland, Harperley, Hesleden, four ♂s and four ♀s, June-Aug. 1902.

Molophilus propinquus Egg. South Durham, one ♂; Brancepeth, one ♀, June 1902; Hesleden, two ♀s, Aug. 1902.

Molophilus bifilatus Verr. Hesleden, one ♂, Aug. 1900.

Molophilus obscurus Mg. South Durham, one ♂; Hesleden, one ♀, Aug. 1902.

Rhypholophus lineatus Mg. Stanhope, two ♂, May 1900.

Rhypholophus nodulosus Mcq. Bishop Auckland, one ♂, May 1900; Hesleden, one ♂, Aug. 1900; Stanhope, one ♀, May 1900, common.

Rhypholophus varius Mg. Wearhead, two ♂s, Aug. 1900.

Rhypholophus hæmorrhoidalis Ztt. Wearhead, one ♂, Aug. 1901.

Erioptera flavescens Mg. Wearhead, one ♂, Aug. 1901; Brancepeth, one ♂ and three ♀s, June 1902.

Erioptera macrophthalma Lw. Hesleden, one ♀, June 1900.

Erioptera tænionota Mg. Bishop Auckland, May 1900.

Erioptera fuscipennis Mg. Bishop Auckland, four ♂s, May 1900.

Erioptera trivialis Mg. Wearhead, four ♂s, Aug. 1901; Hesleden, one ♀, Aug. 1899.

Lipsothrix errans Wlk. Belburn, one ♂ and one ♀, June 1898.

Idioptera pulchella Mg. Wearhead, two ♂s, Aug. 1901.

Dactylolabis gracilipes Lw. Harperley, two ♂s, June 1900.

Limnophila Meigenii Verr. Waskerley, one ♀, July 1901.

Limnophila dispar Mg. Harperley, three ♂s, June 1900.

Limnophila lineola Mg. South Durham, one ♀.

- Limnophila lineolella* Verr. Wearhead, one ♀, March 1901; Bedburn, one ♂ and one ♀, July 1902.
- Limnophila ochracea* Mg. Bishop Auckland, one ♂, July; Hesleden, two ♂s and three ♀s, Aug. 1902.
- Limnophila discicollis* Mg. Bedburn, one ♂, July 1902.
- Limnophila lucorum* Mg. Bedburn, two ♂s and two ♀s, July 1902.
- Limnophila nemoralis* Mg. Bishop Auckland, one ♀, July 1900; Wearhead, one ♂, Aug. 1901; Hesleden, two ♂s, Aug. 1902.
- Trichocera annulata* Mg. Bishop Auckland, one ♂ and two ♀s, Nov. 1901.
- Trichocera hiemalis* Deg. Common in winter.
- Trichocera fuscata* Mg. Common in winter.
- Trichocera regelationis* L. Common in winter.
- Ula pilosa* Schm. Stanhope, one ♂, May; Harperley, one ♂, June 1900.
- Dicranota bimaculata* Schm. Hesleden, one ♂ and one ♀, April 1901.
- Amalopsis immaculata* Mg. Shipley, three ♂s, May 1898; Bishop Auckland, one ♀, 1902.
- Amalopsis unicolor* Schm. Harperley, one ♂, June 1902.
- Pedicia rivosa* L. Gibside, one ♂, 1896; Hesleden, two ♂s, July 1900.

Fam. TIPULIDÆ.

- Pachyrrhina crocata* L. Bedburn, two ♀s, July 1902.
- Pachyrrhina histrio* F. Bishop Auckland, two ♂s, July 1900; Hesleden, one ♂ and three ♀s, Aug. 1889.
- Pachyrrhina maculosa* Mg. Bishop Auckland, two ♀s, Bollihope, one ♀, June 1897-1901.
- Pachyrrhina cornicina* L. Bishop Auckland, two ♂s; Harperley, one ♀, June 1902.
- Pachyrrhina guestfalica* Westh. Bishop Auckland, one ♀, July 1901.
- Pachyrrhina analis* Schm. Bishop Auckland, one ♂, July 1902.
- Pachyrrhina quadrifaria* Mg. Bishop Auckland, one ♀, July; Hesleden, one ♂ and four ♀s, Aug. 1900.
- Pachyrrhina lunulicornis* Schm. Bishop Auckland, one ♂; Harperley, one ♂, June 1902.
- Pachyrrhina annulicornis* Mg. Harperley, one ♂, June 1902.
- Tipula pagana* Mg. Shull, four ♂s, Sep. 1900.
- Tipula confusa* V. d. Wulp. Shull, two ♂s, Sept. 1900; Wearhead, six ♂s and two ♀s, Aug. 1901.
- Tipula longicornis* Schm. Bishop Auckland, one ♂; Harperley, two ♂s and two ♀s, June 1902.
- Tipula truncorum* Mg. ? Bishop Auckland, one ♀, June 1901.
- Tipula hortensis* Mg. Bishop Auckland, two ♂s, June 1897-1901; Harperley, one ♀, June 1901; Waskerley, one ♀, April 1901; Raby, one ♂ and two ♀s, May 1901.
- Tipula varipennis* Mg. Wearhead, two ♂s, June 1901; Barnard Castle, two ♀s, June 1901.
- Tipula scripta* Mg. Wearhead, one ♂, Aug. 1901; Harperley, one ♂, June 1902.
- Tipula plumbea* F. Harperley, one ♂, June 1901; one ♂, June 1902; Bedburn, one ♂ and one ♀, July 1902.
- Tipula lunata* L. Harperley, three ♂s and two ♀s, June 1902.
- Tipula lateralis* Mg. Bishop Auckland, two ♂s; Bollihope, two ♂s; Harperley, one ♀, June 1900; Waskerley, one ♀, July 1901; Hesleden, four ♂s and two ♀s, Aug. 1900; Wearhead, two ♀s, Aug. 1901.

- Tipula vernalis*** Mg. Harperley, one ♂, June 1900; Bollihope, one ♀, June 1901; Waskerley, one ♀, July 1901; Belburn, two ♀s, Aug. 1898.
- Tipula vittata*** Mg. Harperley, one ♂, June 1900; Belburn, one ♀, April 1900; Raby, one ♀, April 1900.
- Tipula gigantea*** Schrk. Harperley, one ♂, June 1900; one ♂, June 1902; Shull, one ♂, July 1902.
- Tipula lutescens*** F. Bishop Auckland, one ♂, July 1900; South Durham, one ♀; Harperley, one ♂, June 1902; Hesleden, two ♂s, Aug. 1902.
- Tipula oleracea*** L. Bishop Auckland, one ♂, June 1900; Hesleden, one ♀, Aug. 1899, common.
- Tipula paludosa*** Mg. Hesleden, two ♂s and two ♀s, Aug. 1900; Wearhead, four ♂s and four ♀s, Aug. 1901.
- Tipula fascipennis*** Mg. Hesleden, one ♂, Aug. 1900; Harperley, two ♂s, June 1902.
- Tipula peliostigma*** Schum. ? Bishop Auckland, one ♀, June 1902.
- Tipula ochracea*** Mg. Barnard Castle, one ♂, June 1900; Bishop Auckland, five ♂s, June 1900-1901.

Fam. RHYPHIDÆ.

- Rhyphus fenestralis*** Scop. Bishop Auckland, four ♀s, July 1900-1901; Hesleden, one ♂.
- Rhyphus punctatus*** F. Bishop Auckland, two ♂s and one ♀, June 1900; Shull, one ♀, Sept. 1900; Hesleden, one ♀, Aug. 1900.

Fam. STRATIOMYIDÆ.

- Chrysonotus bipunctatus*** Scop. Hesleden, two ♀s, Aug. 1899.
- Sargus flavipes*** Mg. Hesleden, three ♂s and one ♀, Aug. 1899-1900.
- Sargus cuprarius*** L. Bishop Auckland, one ♀, June 1897; Hesleden, two ♂, Aug. 1902.
- Sargus iridatus*** Scop. Bishop Auckland, three ♂s and five ♀s; Waskerley, one ♂; Evenwood, one ♂, June-July 1897-1901.
- Microchrysa polita*** L. Bishop Auckland, four ♂s and four ♀s; Hesleden, one ♂, July-Aug.
- Microchrysa flavicornis*** Mg. Bishop Auckland, four ♂s and one ♀, June-July 1901.
- Beris vallata*** Forst. Bishop Auckland, one ♀, July 1900.
- Beris chalybeata*** Forst. Bishop Auckland, eleven ♂s and nine ♀s, May-June 1897-1900.
- Beris geniculata*** Curt. Bishop Auckland, two ♂s and two ♀s, June-July 1900-1901; Hesleden, two ♂s and one ♀, Aug. 1902.

Fam. TABANIDÆ.

- Hæmatopota pluvialis*** L. Wearhead, five ♀s, Aug. 1897; Waskerley, one ♂ and one ♀, July 1901.
- Theriopectes montanus*** Mg. Waskerley, one ♀, July 1901.
- Theriopectes solstitialis*** Mg. Bishop Auckland, one ♀.
- Tabanus autumnalis*** L. Bishop Auckland, one ♂ and two ♀s, July 1899.
- Chrysops cæcutiens*** L. Escomb, one ♀; Bishop Auckland, six ♀s, July 1897-1902.

Fam. LEPTIDÆ.

- Leptis scolopacea*** L. Bishop Auckland, one ♂ and two ♀s; Wearhead, one ♂, June 1899-1901; Gibside, one ♀; Waskerley, two ♂s, July 1901.
- Leptis tringaria*** L. Hesleden, five ♂s and three ♀s, July-Aug. 1899-1900; Bishop Auckland, one ♂, July 1901.
- Leptis conspicua*** Mg. Common at Hesleden in August.

Leptis lineola F. South Durham, one ♀.

Chrysopilus auratus F. Hesleden, three ♂s and one ♀; Shull, one ♂ and one ♀; Belburn, one ♀; Bishop Auckland, one ♂ and one ♀, June-Aug. 1899-1901.

Symphoromyia crassicornis Pz. Bishop Auckland, two ♀, July 1900-2.

Fam. ASILIDÆ.

Dioctria rufipes Deg. Bishop Auckland, five ♂s and seven ♀s; Barnard Castle, one ♀; Harperley, one ♀, June 1897-1900.

Philonicus albiceps Mg. Hesleden, two ♂s and one ♀, Aug. 1900.

Fam. BOMBYLIDÆ.

Bombylius major L. Gibside, three ♂s and one ♀, April 1896; Hesleden, four ♂s and ten ♀s, April 1901.

Fam. THEREVIDÆ.

Thereva nobilitata F. Hesleden, two ♂s and four ♀s, Aug. 1902.

Thereva annulata F. Hesleden, six ♂s and four ♀s, Aug. 1902.

Fam. EMPIDÆ.

Hybos grossipes L. Hesleden, four ♂s, Aug. 1900; Shull, one ♂, Sept. 1900; Wearhead, three ♂, Aug. 1901; Bishop Auckland, one ♂, July 1901.

Hybos femoratus Müll. Wearhead, one ♂, Aug. 1901.

Cyrtoma spuria Flin. Harperley, one ♀, June 1900.

Rhamphomyia nigripes F. Evenwood, two ♂s; Harperley, one ♂; Wearhead, one ♀, June-Aug. 1897-1901.

Rhamphomyia sulcata Flin. Hesleden, one ♂ and one ♀; Bishop Auckland, three ♂s and two ♀s; Escomb, one ♀; Waskerley, one ♀, May-July 1897-1901.

Rhamphomyia dentipes Ztt. Bishop Auckland, four ♂s and one ♀, May-June 1897.

Rhamphomyia variabilis Flin. Wearhead, three ♂s, Aug.; Shull, one ♂ and three ♀s, Sept. 1900.

Rhamphomyia umbripennis Mg. Bishop Auckland, two ♂s and one ♀, June-July 1901.

Rhamphomyia flava Flin. Hesleden, one ♂ and seven ♀s, July-Aug. 1900.

Empis tessellata F. Common everywhere.

Empis livida L. Hesleden, eight ♂s and nine ♀s, Aug. 1899-1900.

Empis borealis L. Wearhead, one ♀, June 1901.

Empis stercorea L. Harperley, one ♀, June 1900.

Empis trigramma Mg. Common everywhere, May-Aug.

Empis punctata Mg. Bishop Auckland, six ♂s and four ♀s; Harperley, three ♂s; Escomb, one ♂, May-June 1897-1900.

Empis pennipes L. Bishop Auckland, one ♀, June 1900.

Empis vernalis Mg. Hesleden, two ♂s and one ♀; Harperley, one ♂; Bishop Auckland, two ♀, June 1900.

Empis vitripennis Mg. Shull, one ♂, Sept. 1900.

Empis chioptera Flin. Bishop Auckland, two ♂s, May 1900.

Hilara maura F. Common, May-June.

Hilara manicata Mg. Bishop Auckland, one ♂, July 1900.

Hilara quadrivittata Mg. Bishop Auckland, one ♀, June 1901.

Hilara chorica Flin. Escomb, three ♂s, May-June 1899.

Hilara thoracica Mcq. Bishop Auckland, two ♂s, June-July 1901.

Ædalia holmgreni Ztt. Bishop Auckland, two ♀s, June 1901.

- Oxydromia glabricula* Flin. Hesleden, one ♂; Bishop Auckland, two ♂s and two ♀s; Shull, one ♀, April-Sept. 1900-1901.
Clinocera fontinalis Hal. Bollihope, one ♀, June 1901.
Clinocera bistigma Lurt. Wearhead, one ♂ and three ♀s, Aug. 1901.
Ardoptera irrorata Flin. Bollihope, one ♂, June 1901.
Chersodromia arenaria Hal. Hesleden, two ♂s and two ♀s, Aug. 1900.
Tachydromia flavipes F. Bishop Auckland, seven ♂s and five ♀s, May 1897 and 1900; Stanhope, one ♂, May 1900; Evenwood, one ♀, May 1897.
Tachydromia cursitans F. Hesleden, one ♂, Aug. 1899; Bishop Auckland, two ♀s, July 1900-1901.
Tachydromia bicolor F. Hesleden, one ♂, Aug. 1899.

Fam. DOLICHOPODIDÆ.

- Psilopus platypterus* F. Bishop Auckland, one ♀, July 1900.
Neurigona quadrifasciata F. Barnard Castle, one ♀, June 1900.
Dolichopus atripes Mg. Waskerley, one ♂ and one ♀, July 1901.
Dolichopus vitripennis Mg. Waskerley, seven ♂s, July 1901.
Dolichopus atratus Mg. Waskerley, five ♂s and five ♀s, July 1901.
**Dolichopus picipes* Mg. Bedburn, five ♂s and two ♀s.
Dolichopus plumipes Scop. Waskerley, twelve ♂s; Wearhead, two ♂s, July-Aug. 1901.
Dolichopus pennatus Mg. Harperley, one ♂, June 1902.
Dolichopus popularis W. Bishop Auckland, one ♂; Bedburn, two ♂s and three ♀s, June-July 1902.
Dolichopus urbanus Mg. Bedburn, two ♂s, July 1902.
Dolichopus griseipennis Stan. Hesleden, two ♂s and one ♀, Aug.; Bishop Auckland, two ♂s, July 1899-1901.
Dolichopus trivialis Hal. Bishop Auckland, two ♂s and one ♀, July; Hesleden, three ♂s and one ♀, July-Aug.; Waskerley, one ♂, July; Wearhead, two ♀s, July 1899-1901.
Dolichopus brevipennis Mg. South Durham, two ♂s.
Dolichopus æneus Deg. Common.
Hercostomus nigripennis Flin. Wearhead, one ♂, Aug. 1901.
Gymnopternus cupreus Flin. Bedburn, one ♂, July 1902.
Gymnopternus ærosus Flin. Waskerley, eight ♂s; Bishop Auckland, one ♂, July 1900-1901.
Chrysotus gramineus Flin. Hesleden, one ♀, Aug. 1900.
Argyra diaphana F. Bedburn, one ♀, 1902.
Argyra argentina Mg. Belburn, one ♂, July 1897; Wearhead, one ♂, Aug. 1901.
Syntormon pallipes F. Hesleden, one ♂ and one ♀, Aug. 1901.
Xiphandrium caliginosum Mg. Bishop Auckland, one ♂, May 1900.
Xiphandrium monotrichum Lw. Bedburn, one ♂ and one ♀, July ——.
Scellus notatus F. Bishop Auckland, one ♂, June 1900; Hesleden, four ♀s, Aug. 1899-1900.
Hydrophorus præcox Lehm. Hesleden, one ♂ and four ♀s, June-Aug. 1900; Wearhead, one ♂, Aug. 1901.
Liancalus virens Scop. Wearhead, one ♀, Aug. 1901.
Campsicnemus curvipes Hesleden, one ♂, Aug. 1900.

Fam. LONCHOPTERIDÆ.*

- Lonchoptera punctum* Mg. Bishop Auckland, one ♂, March 1898; Harperley, two ♀s, April 1900; Belburn, one ♂, May 1900.
Lonchoptera trilineata Ztt. Gibside, one ♀, April 1898; Bishop Auckland, March 1898; Harperley, one ♀, April 1900.

Lonchoptera lacustris Mg. Gibside, one ♂ and one ♀, April 1898; Harperley, two ♀s, April 1900; Bishop Auckland, two ♀s, Feb. and March 1898.

Lonchoptera tristis Mg. Bishop Auckland, three ♀s, Jan. 1902.

Fam. PLATYPEZID.Æ.

Callimyia speciosa Mg. Bishop Auckland, two ♂s, June 1901-2.

Callimyia amœna Mg. Bishop Auckland, one ♂, June; one ♀, Sept.; Hesleden, one ♂, Aug. 1902.

Fam. PIPUNCULID.Æ.

Verrallia pilosa Ztt. Harperley, one ♀, June 1900.

Pipunculus furcatus Egg. Barnard Castle, one ♀, June 1901.

Pipunculus terminalis Thoms. Bedburn, one ♀, July 1902.

Pipunculus campestris Ltr. Hesleden, one ♂ and one ♀, Aug. 1900 and 1902; Bishop Auckland, one ♀, Sept. 1902.

Pipunculus pratorum Flin.? Hesleden, two ♀s, Aug. 1902.

Pipunculus campestris Ltr. Hesleden, one ♀, August 1900.

Pipunculus pilosus Ztt. Harperley, one ♀, June 1900.

Fam. SYRPHID.Æ.

Pipizella virens F. Hesleden, one ♀, Aug. 1902.

Pipiza noctiluca. Belburn, one ♂, June 1898; Bishop Auckland, three ♀s, June-July 1901.

Liogaster metallina F. Bollilhope, one ♀, June 1901.

Chrysogaster hirtella Lw. Harperley, two ♀s, June; Bedburn, three ♀s, July; Hesleden, one ♀, Aug. 1902.

Chilosia maculata Flin. Belburn, eight ♂s, June 1898-1899.

Chilosia sparsa Lw. Hesleden, one ♂, May 1899.

Chilosia pulchripes Lw. Hesleden, one ♀, Aug. 1899; Harperley, one ♀, April 1900.

Chilosia variabilis Panz. Harperley, one ♀, April 1900; Co. Durham, one ♀.

Chilosia intonsa Lw. Hesleden, one ♀, Aug. 1899.

Chilosia illustrata Har. Hesleden, ten ♂s and five ♀s, July-Aug. 1899-02.

Chilosia impressa Lw. Hesleden, one ♀, Aug. 1899.

Chilosia albitarsis Mg. Belburn, two ♀s and one ♀, June 1898; Hesleden, one ♂ and one ♀, Aug. 1899; Evenwood, one ♂ and one ♀, June 1899; Harperley, one ♂ and one ♀, June 1900; Bishop Auckland, three ♀s, June-July 1899-1901.

Chilosia fraterna Mg. Gibsonces, one ♂, Aug. 1897.

Chilosia vernalis Flin. Hesleden, three ♂s, Aug. 1899.

Chilosia proxima Ztt. Hesleden, one ♀, Aug. 1899.

Platychirus manicutus Mg. Very common.

Platychirus peltatus Mg. Belburn, one ♂ and two ♀s, June-July; Wearhead, one ♂, July 1897; Escomb, one ♀, April 1898.

Platychirus scutatus Mg. Very common.

Platychirus albimanus F. Very common.

Platychirus clypeatus Mg. Common.

Platychirus angustatus Ztt. Hesleden, common at rushes.

Pyrophæna granditarsa Forst. Hesleden, one ♀, Aug. 1902.

Pyrophæna rosarum F. Harperley, one ♀, June 1902.

Melanastomum mellinum L. Very common.

Melanastomum scalare F. Very common.

- Leucozona lucorum* L. Gibsonees, one ♂, Aug. 1897; Belburn, two ♂ s, June 1898; Hesleden, one ♀, Aug. 1900.
- Ischyrosyrphus glaucius* L. Gibside, one ♂ and four ♀ s, Aug. 1896; Wearhead, one ♀, Aug. 1901; Hesleden, six ♀ s, Aug. 1899; Shipley, two ♀ s, July 1900.
- Catabomba pyrastris* L. Hesleden, six ♂ s and six ♀ s, Aug. 1899; Gibside, one ♀; Barnard Castle, one ♀, June 1900.
- Catabomba selenitica* Mg. Wearhead, one ♂, Aug. 1901.
- Syrphus albostriatus* Flin. Hesleden, one ♂ and one ♀, Aug. 1899; Gibside, one ♀, Aug. 1896; Bishop Auckland, one ♀, July 1900.
- Syrphus albostriatus* var. *confusus*. Bishop Auckland, one ♂ and one ♀, July 1901.
- Syrphus tricinctus* Flin. Hesleden, one ♂ and one ♀, Aug. 1899; Harperley, one ♂, June 1900; Gibside, two ♀ s, Aug. 1896.
- Syrphus venustus* Mg. Evenwood, four ♂ s and one ♀, June 1897-1899; Bishop Auckland, two ♀ s, June 1887; Belburn, one ♂ and two ♀ s, June 1898-1899; Barnard Castle, one ♀, June 1900.
- Syrphus lunulatus* Mg. Hesleden, one ♀, Aug. 1902.
- Syrphus vittiger* Ztt. Hesleden, one ♂ and one ♀, Aug. 1899; Gibside, one ♀, Aug. 1896; Shipley, one ♀, May 1898; Harperley, one ♀, June 1900; Wearhead, one ♀, Aug. 1901.
- Syrphus grossulariæ* Mg. Hesleden, eleven ♀ s, Aug. 1899; Gibside, three ♀ s, Aug. 1896.
- **Syrphus ribesii* L. Very common.
- **Syrphus vitripennis* Mg. Common.
- Syrphus latifasciatus* Mcq. Wearhead, three ♂ s and one ♀, Aug. 1901.
- Syrphus corollæ* E. Common.
- Syrphus luniger* Mg. Common.
- Syrphus bifasciatus* F. Bishop Auckland, three ♀ s, June 1897-1899.
- Syrphus balteatus* Deg. Very common.
- Syrphus cinctellus* Ztt. Gibside, one ♂ and one ♀, Aug. 1896; Hesleden, one ♂ and nine ♀ s, Aug. 1899; Shull, two ♀ s, Sept. 1900; Shipley, one ♀, July 1900.
- Syrphus cinctus* Flin. Bishop Auckland, one ♂ and one ♀, July 1901.
- Syrphus auricollis* Mg. Bishop Auckland, one ♂, July 1897.
- Syrphus auricollis* var. *maculicornis* Ztt. Hesleden, one ♂ and one ♀, Aug. 1899.
- Syrphus umbellatarum* F. Hesleden, one ♀, Aug. 1899.
- Syrphus compositarum* Verr. Hesleden, four ♀ s, July-Aug. 1899.
- Syrphus labiatarum* Verr. Hesleden, one ♂, Aug. 1902.
- Sphærophoria scripta* L. Hesleden, thirteen ♂ s and twelve ♀ s, Aug. 1899-1900.
- Sphærophoria scripta* var. *nigricoxa* Ztt. Hesleden, three ♂ s, Aug. 1899-1900.
- Sphærophoria menthastri* L. Hesleden, three ♂ s, Aug. 1899-1900; Wearhead, two ♂ s, Aug. 1901.
- Sphærophoria menthastri* var. *picta* Mg. Hesleden, four ♂ s and eleven ♀ s; Bishop Auckland, Wearhead, etc., 1897-1901.
- Sphærophoria menthastri* var. *tæniata* Mg. Wearhead, one ♂, Aug. 1901; Hesleden, one ♂, Aug. 1902.
- **Baccha elongata* F. Hesleden, one ♂ and seven ♀ s; Bishop Auckland, two ♀ s, June-Aug. 1897-1901.
- Sphegina clunipes* Flin. Shipley, one ♀, July 1900.
- Ascia podagrica* F. Very common.
- Ascia floralis*. Bedburn, two ♂ s and three ♀ s, July 1902.

- Brachyopa bicolor* Flin. Bishop Auckland, one ♂, May 1901.
Rhingia campestris Mg. Common.
Volucella bombylans L. Witton, one ♂, July 1897; Shull, one ♀, Sept. 1900; Gibside, one ♀.
Volucella bombylans var. *plumata*. Wearhead, one ♀, Aug. 1901.
Volucella bombylans var. (a) *hæmorrhoidalis*. Wearhead, one ♀, Aug. 1897.
Volucella pellucens L. Common.
**Eristalis æneus* Scop. Hesleden, one ♀, Aug. 1898.
Eristalis tenax L. Very common.
Eristalis intricarius L. Hesleden, eight ♂s and five ♀s, Aug. 1899-1900.
Eristalis arbustorum L. Very common.
Eristalis nemorum L. Hesleden, one ♂, Aug. 1899; Wearhead, one ♀, Aug. 1901.
Eristalis pertinax Scop. Very common.
Eristalis rupium F. Hesleden, one ♂ and one ♀, Aug. 1898-1900; Gibside, one ♀; Gibsonees, one ♀, Aug. 1897; Wearhead, six ♀, Aug. 1901.
Eristalis horticola Deg. Gibsonees, one ♂, Aug. 1897; Hesleden, one ♂ and two ♀s, July-Aug. 1899.
**Myiatria florea* L. Hesleden, one ♂, Sept. 1900; Gibsonees, one ♀, 1897; Bishop Auckland (Greenhouse), one ♀, 19th April; Bishop Auckland (Greenhouse), one ♀, 23rd May 1900.
Helophilus pendulus Mg. Hesleden, four ♂s and two ♀s, Aug.-Sept. 1899; Wearhead, one ♂, Aug. 1901; Gibside, two ♂s, Aug. 1897.
Merodon equestris var. *narcissi* F. Bishop Auckland, two ♂s, July 1901.
Merodon equestris var. *validus* Mg. Bishop Auckland, two ♂s, June 1900.
Criorrhina floccosa Mg. Bishop Auckland, two ♀s, June 1899-1900.
Xylota segnis L. Common.
Xylota lenta Mg. Bishop Auckland, one ♂, June 1899.
Xylota sylvarum L. Bishop Auckland, one ♂, July 1901; Harperley, one ♀, July 1900; Hesleden, one ♀, Aug. 1900.
Xylota abiens W. Gibsonees, one ♂, Aug. 1897.
Syritta pipiens L. Very common.
Chrysochlamys cuprea Scop. Hesleden, five ♀s, Aug. 1899.
Arctophila mussitans F. Hesleden, five ♂s and one ♀, Aug. 1898; Shull, one ♂, Sept. 1900.
Sericomyia borealis Flin. Gibside and Wearhead, twenty ♂s, Aug. 1896 and 1901.
Sericomyia lappona L. Wearhead, one ♂, June 1901.
Chrysotoxum arctuatatum L. Hesleden, two ♂s, Aug. 1899.
Chrysotoxum bicinctum L. Hesleden, two ♀s, Aug. 1899.

Fam. CONOPIDÆ.

- Myopa buccata* L. Harperley, two ♂s and two ♀s, June 1900; Bollihope, one ♀, June 1901.

Fam. TACHINIDÆ.

- Ceromasia spectabilis* Mg. Bishop Auckland, one ♂, July 1901.
Gymnochæta viridis Flin. Escomb, one ♂, May 1897.
**Parexorista fugax* Rnd.? Bishop Auckland, two ♂s (bred), Oct. 1899.
**Parexorista grossa* R.&R. Waskerley, one ♂, July 1901.
Blepharidea vulgaris Flin. Bishop Auckland, two ♀s; Harperley, one ♀, May-Aug. 1900-1901.
Phorocera cilipeda Rnd. Bishop Auckland, one ♂ and one ♀, Aug. 1901.
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- Aporomyia dubia* Fln. Bishop Auckland, one ♂, May 1901.
Somolia simplicitarsis Ztt. (*rebaptizata* Rnd.). Hesleden, two ♀s, Aug. 1900.
Melanota volvulus F. Hesleden, seven ♂s and one ♀; Gibside, one ♂, July-Aug. 1896-1901.
Olivieria lateralis F. Hesleden, two ♂s and six ♀s, July-Aug. 1899-1900.
Micropalpus vulpinus Fln. Hesleden, one ♀, July 1899.
Micropalpus pictus Mg. Shull, one ♂, July 1900.
Erigone rudis Fln. Hesleden, two ♂s and one ♀, July-Aug. 1899-1900; Shull, common, July 1902.
Erigone consobrina Mg. Hesleden, two ♂, Aug. 1900.
Plagia ruralis Fln. Hesleden, one ♂ and one ♀, Aug. 1900.
Urophylla seria Mg. Bishop Auckland, one ♂, July 1902.
Digonochæta setipennis Fln. Bishop Auckland, three ♂s and one ♀, May-July, 1899-02.
Thryptocera crassicornis Mg. Bishop Auckland, one ♀; Wearhead, one ♀, July-Aug. 1900-1901.
Siphona cristata F. Belburn, two ♂s and one ♀; Bishop Auckland, one ♂; Evenwood, one ♀, May-July 1897-1900.
Siphona geniculata Deg. Marley Hill, two ♂s; Wearhead, one ♂; Hesleden, two ♀s; Gibside, one ♀, Aug.-Sept. 1896-1901.
Stevenia maculata Fln. Hesleden, one ♀, Aug. 1900.
Brachycoma devia Fln. Hesleden, one ♀, Aug. 1900.
Cynomyia alpina Ztt. Harperley, one ♂, May 1902.
Cynomyia mortuorum L. Harperley one ♂; Bishop Auckland, one ♀, June-July 1899-1900.
Onesia sepulchralis L. Hesleden, five ♂s and six ♀s; Wearhead, one ♂; Bishop Auckland, one ♂, May-Aug. 1899-1901.
Onesia cognata Mg. Hesleden, two ♂s and one ♀, Aug. 1900.
Sarcophaga carnaria L. Common everywhere.
Sarcophaga atropos Mg. Hesleden, two ♂s and two ♀s, Aug. 1900.
Sarcophaga cruentata Mg. Hesleden, two ♂s and one ♀, Aug. 1900.

Fam. MUSCIDÆ.

- Stomoxys calcitrans* L. Hesleden, five ♂s and five ♀s; Bishop Auckland, one ♂ and two ♀s, April-Oct.
Hæmatobia stimulans Mg. Hesleden, one ♂, Aug. 1900; Bishop Auckland, two ♂s, June 1902.
Pollenia vespillo F. Wearhead, one ♂ and one ♀, Aug. 1901.
Pollenia rudis F. Many localities, five ♂s and five ♀s, March-July.
Mysospila meditabunda F. Stanhope, one ♂; Hesleden, one ♂ and two ♀s, April-May 1900-1901.
Graphomyia maculata Scop. Hesleden, four ♂s and two ♀s, July-Aug. 1899-1900.
Musca domestica L. Hesleden and Bishop Auckland, four ♂s and one ♀.
Cyrtoneura stabulans Fln. Hesleden, one ♂; Bishop Auckland, one ♂ and three ♀s.
Cyrtoneura pabulorum Fln. Wearhead, one ♀, Aug. 1901.
Morellia simplex Lw. Common everywhere.
Morellia hortorum Fln. Hesleden, three ♂s and two ♀s; Wearhead, one ♀, July-Aug. 1899-1901.
Mesembrina merediana Mg. Hesleden, five ♂s; Belburn, one ♂ and two ♀s; Marley Hill, one ♂ and one ♀; Wearhead, one ♂ and four ♀s, June-Aug.

- Pyrellia cyanicolor* Ztt. Marley Hill, two ♀s.
Pyrellia lasiophthalma Mcq. Bishop Auckland, six ♂s and four ♀s; Harperley, one ♂; Marley Hill, one ♀, April 1900-1901.
Protocalliphora grœnlandica Ztt. Very common, especially at Bishop Auckland.
Calliphora erythrocephala Mg. Very common.
Calliphora vomitoria L. Common, but not so common as *erythrocephala*.
Euphoria cornicina F. Many locals, not uncommon.
Lucilia cæsar L. Very common.
Lucilia sericata Mg. Hesleden, one ♂ and one ♀, Aug. 1900.
Lucilia ruficeps Mg. Bishop Auckland, one ♂ and one ♀, June 1900.

Fam. ANTHOMYIDÆ.

- Polietes lardaria* F. Common everywhere.
Polietes albolineata Flin. Evenwood, one ♂ and two ♀s, June 1897; Hesleden, eight ♂s and five ♀s, Aug. 1899; Wearhead, one ♀, Aug. 1901.
Hyedotesia incana W. Bishop Auckland, three ♂s, May 1897; Wearhead, three ♂s and two ♀s, Aug. 1901.
Hyedotesia lucorum Flin. Escomb, three ♂s and one ♀; Bishop Auckland, one ♂; Gibside, one ♀; Stanhope, one ♂; Hesleden, one ♂, March-May 1898-1901.
Hyedotesia marmorata Ztt. Wearhead, one ♀, Aug. 1901.
Hyedotesia serva Mg. Escomb, one ♂; Evenwood, one ♀, May 1897-1899; Bishop Auckland, two ♂s and two ♀s, June 1902.
Hyedotesia nivalis Rnd. Wearhead, one ♂, Aug. 1901.
Hyedotesia obscurata Mg. Wynyard, one ♂, May 1902.
Hyedotesia variabilis Flin. Harperley, one ♂, June 1902.
Hyedotesia longipes Ztt. Wynyard, one ♂, June 1902.
Hyedotesia umbratica Mg. Belburn, one ♂, May; Bishop Auckland, one ♀, June 1900; Wearhead, two ♂s, June 1901.
Hyedotesia lasiophthalma Mcq. Hesleden, two ♀s; Shipley, one ♀, May-Aug. 1900.
Hyedotesia rufipalpis Mcq. South Durham, one ♂.
Hyedotesia populi Mg. Hesleden, one ♂, Aug. 1900; Bishop Auckland, four ♀s, June-Sept. 1897-1901.
Hyedotesia variegata Mg. Bishop Auckland, one ♀, June 1902.
**Hyedotesia palida* F. Shipley, three ♂s, July 1900.
Allœostylus flaveola Flin. Bishop Auckland, two ♀s, July 1902.
Mydea vespertina Flin. Bishop Auckland, one ♂, May 1902.
**Mydea nigritella* Ztt. Bishop Auckland and Bedburn, five ♂s, March-July 1897-1901.
Mydea urbana Mg. Hesleden, one ♂ and one ♀, Aug. 1900; Bishop Auckland, three ♀s, June 1897-1901.
Mydea tincta Ztt. Shull, one ♂, July 1902.
Mydea pagana F. Wearhead, one ♂ and one ♀, Aug. 1901.
Mydea impuncta Flin. Bishop Auckland and Wearhead, six ♂s and six ♀s, May-Sept.
Mydea separata Mg. Harperley, two ♂s, June; Brancepeth, one ♂, June; and Shull, one ♀, July 1902.
Sphecolyma inanis Flin. Bishop Auckland, one ♀, July 1902.
Spilogaster nigrinervis Ztt. Bedburn, one ♂, July 1897; Harperley, one ♀, June 1902.
Spilogaster duplicata Mg. Hesleden, six ♂s and five ♀s; Wearhead, Shull, and Shipley, one ♂, May-Aug. 1899-1901.

- Spilogaster communis* Dsv. Hesleden, one ♂, Aug. 1900; Shull, one ♀, Sept. 1900.
- Spilogaster duplaris* Ztt. Harperley, one ♂, July 1900.
- Spilogaster ciliatocosta* Ztt. Shull, one ♂, April 1900.
- Limnophora compuncta* W. Wearhead, two ♂s, June 1901.
- Limnophora solitaria* Ztt. Bollihope, one ♂, June; Wearhead, one ♂, Aug. 1901.
- Melanochila riparia* Flin. Wearhead, one ♂, Aug. 1901.
- Macrorchis meditata* Flin. Wearhead; one ♂, Aug. 1901; Bishop Auckland, one ♂ and two ♀s, June 1901.
- Hydrotea occulta* Mg. Bishop Auckland, six ♂s, May and Aug. 1900.
- Hydrotea irritans* Flin. From swarms at Waskerley, two ♂s and two ♀s, July 1901.
- Hydrotea dentipes* F. Very common.
- Ophyra leucostoma* W. Hesleden, six ♂s, Aug. 1899; Bishop Auckland, one ♀, July 1900.
- Drymia hamata* Flin. Hesleden, twelve ♂s and five ♀s, July-Aug. 1899-1900.
- Trichopticus hirsutulus* Ztt. Wearhead, five ♂s and two ♀s, Aug. 1901.
- Trichopticus pulcher* Mde. Wearhead, two ♂s and one ♀, June and Aug. 1901.
- Hydrophoria conica* W. Bishop Auckland, five ♂s and three ♀s, June 1897.
- Hydrophoria linogrisea* Mg. Bishop Auckland, four ♂s and one ♀, April-June 1897-02.
- Hylemyia variata* Flin. Hesleden, two ♂s and six ♀s, Aug. 1899-1900; Shull, one ♂ and three ♀s, Sept. 1900.
- Hylemyia seticrura* Rnd. Hesleden, three ♂s and one ♀, Aug. 1899-1900.
- Hylemyia pullula* Ztt. Hesleden, three ♂s, Aug. 1900.
- Hylemyia strigosa* F. Common everywhere, twelve ♂s and eight ♀s.
- Hylemyia nigrimana* Mg. Stanhope, two ♂s, May 1900; Bishop Auckland, one ♂ and one ♀, June 1902.
- Hylemyia coarctata* Flin. Hesleden, three ♀s, Aug. 1900.
- Mycophaga fungorum* Deg. Bishop Auckland, one ♂ and one ♀, Aug.
- Lasiops adelphe* Kow.? Bishop Auckland, one ♂ and one ♀, May 1902.
- Lasiops ctenoctema* Kow. Bishop Auckland, eight ♂s and one ♀, May 1897 to 1902.
- Anthomyia pluvialis* L. Bishop Auckland, one ♀, June 1900; Hesleden, one ♀, July 1900.
- Anthomyia radicum* L. Bishop Auckland, nine ♂s and four ♀s, May-June; Hesleden, five ♂s, Aug.
- Chortophila trapezina* Ztt. Harperley, one ♂, June 1900.
- Chortophila sepia* Mg. Bishop Auckland, one ♂, April 1900.
- Phorbia floccosa* Mcq. Bishop Auckland, two ♂s, May 1900-2.
- Phorbia pudica* Rnd. Belburn, one ♂, May 1900.
- Phorbia intersecta* Mg. Bishop Auckland, one ♂, May 1902.
- Phorbia trichodactyla* Rnd. Bishop Auckland, one ♂, May 1902.
- Phorbia ignota* Rnd. Bishop Auckland, thirteen ♂s, March-May 1902.
- Pegomyia rufipes* Flin. Bishop Auckland, two ♂s and two ♀s, April-May 1902.
- Pegomyia transversa* Flin. South Durham, one ♀.
- Pegomyia bicolor* W. Bishop Auckland, one ♂ and four ♀s, May-July 1897-1901.

- Pegomyia nigratarsis* Ztt. Bishop Auckland, four ♂s and five ♀s, May-June 1900-1901.
- Homalomyia hamata* Mcq. Brancepeth, one ♀, June 1902.
- Homalomyia manicata* Mg. Bishop Auckland, two ♂s, May 1900, April 1902.
- Homalomyia scalaris* F. Bishop Auckland, eight ♂s, May-Oct.
- Homalomyia canicularis* L. Bishop Auckland, one ♂ and four ♀s, May; Evenwood, two ♂s, May; Hesleden, two ♀s, Aug. 1900.
- Homalomyia aërea* Ztt. Wynyard, one ♂, May 1902.
- Homalomyia coracina* Lw. Shull, one ♂, Sept. 1900.
- Homalomyia serena* Flin. Bishop Auckland, three ♂s and one ♀, May 1900-2.
- Homalomyia incisurata* Ztt. Bishop Auckland, one ♂, May 1900.
- Azelia Macquarti* Stæg. Bishop Auckland, three ♂s and one ♀, May 1902.
- Azelia Zetterstedti* Rnd. Hesleden, one ♂ and one ♀, Aug. 1900; Bishop Auckland, one ♂, May 1900.
- Azelia triquetra* W. Stanhope, one ♂, May 1900.
- Azelia aterrima* Mg. Bishop Auckland, one ♂, May 1902.
- Cœlomyia mollissima* Hal. Belburn, one ♂, May 1900.
- Caricea tigrina* F. Shull, five ♂s and two ♀s, Sept. 1900.
- Caricea intermedia* Flin. Bishop Auckland, Harperley, Shull, Bedburn, five ♂s and one ♀, June-July 1902.
- Cœnosia elegantula* Rnd. Bishop Auckland, one ♂, July 1902.
- **Cœnosia tricolor* Ztt. Bishop Auckland, Hesleden, three ♂s and two ♀s, July-Aug. 1900.
- Cœnosia sexnotata* Mg. Hesleden, two ♂s and one ♀, Aug. 1900; Waskerley, one ♂, July 1901; Bishop Auckland, one ♂, July 1901.
- **Lisporephela alma* Mg. Escombe, one ♂, April 1898.
- Fucellia fucorum* Flin. Hesleden shore, three ♂s and seventeen ♀s, April-Aug. 1900-1901.
- Fucellia maritima* Hal. Hesleden shore, two ♂s and four ♀s, June-Aug. 1900.

Fam. CORDYLURIDÆ.

- Parallelomma albipes* Flin. Bedburn, one ♀, July 1902.
- Amaurosoma tibiella* Ztt. Bishop Auckland, one ♂, May 1901.
- Norellia spinimana* Flin. Hesleden, two ♂s and three ♀s, Aug. 1900.
- Spathiophora hydromyzinæ* Flin. Hesleden, one ♀, Aug. 1900.
- Scatophaga inquinata* Mg. Bishop Auckland, three ♂s and three ♀s, May-July 1900.
- Scatophaga lutaria* F. Everywhere, thirteen ♂s and seventeen ♀s, May-Oct.
- Scatophaga stercoraria* L. Everywhere, sixteen ♂s and twenty-five ♀s, April-Oct.
- Scatophaga squalida* Mg. Belburn, one ♂; Stanhope, one ♂; Bishop Auckland, one ♂ and four ♀s; Gibside, one ♀; Harperley, three ♀s, April-June 1900-1901.

Fam. PHYCODROMIDÆ.

- Orygma luctuosum* Mg. Hesleden shore, two ♂s, Aug. 1900.

Fam. HELOMYZIDÆ.

- Helomyza rufa* Lw. Hesleden, one ♀, Aug. 1899; Bishop Auckland, one ♀, March 1900.
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Helomyza pectoralis Lw. Hesleden, one ♂, Aug. 1900.

Helomyza similis Mg. Wearhead, Harperley, five ♂s, April and Aug. 1901.

Helomyza lævifrons Lw. Harperley, one ♂, April 1900; Shull, two ♂s and two ♀s, Sept. 1900.

**Helomyza ustulata* Mg. Bishop Auckland, one ♂, 9th March 1901.

Helomyza montana Lw. Shipley Glen, one ♀, July 1900.

Helomyza zetterstedtii Lw. Shipley, three ♀s, July-Sept. 1900.

Helomyza montana Lw. Shipley, one ♀, July 1900.

Helomyza palida Flin. Bishop Auckland, five ♂s and six ♀s, June-July 1897-1901.

**Helomyza parva* Lw. Shull, one ♀, Sept. 1900.

Blepharoptera serrata L. Bishop Auckland, twelve ♂s and three ♀s, March-July.

Blepharoptera iners Mg. Hesleden, two ♀s, Aug. 1899; Harperley, two ♀s, April 1900.

Tephroclamys rufiventris Mg. Bishop Auckland, one ♂ and twelve ♀s, March-Aug. 1898-1900.

Fam. SCIOMYZIDÆ.

Neuroctena anilis Flin. Bishop Auckland, three ♂s; Hesleden, three ♂s, July-Aug. 1900.

Dryomyza flaveola F. Bishop Auckland, Shull, Harperley, six ♂s and two ♀s, June-Sept. 1900-1901.

Sciomyza albocostata Flin. Hesleden, one ♂, June 1900.

Sciomyza cinerella Flin. Hesleden, two ♂s, June-Aug. 1899-1900.

Tetanocera elata F. Hesleden, two ♂s and one ♀, Aug. 1899-1900.

Tetanocera lævifrons Lw. Bedburn, one ♀, July 1902.

Tetanocera punctulata Scop. Hesleden, one ♂, Aug. 1902.

Limnia rufifrons F. Hesleden, five ♂s and three ♀s, July-Aug. 1889-1900.

Elgiva dorsalis F. Hesleden, one ♂, Aug. 1900.

Fam. PSILIDÆ.

Psila fimentaria L. South Durham, one ♀.

Psila rufa Mg. Hesleden, one ♂ and one ♀, June 1900.

Psila palida. Hesleden, one ♂, June 1900.

Psila nigricornis Mg. Bishop Auckland, two ♂s, May; Greenhouse, one ♂, Feb. 1900.

Psila villosula Mg. Hesleden, one ♂, Aug. 1900.

Loxocera aristata Pz. Hesleden, one ♀, Aug. 1899.

Fam. MICROPEZIDÆ.

Calobata cibaria L. Bishop Auckland, one ♂ and two ♀s, June-July 1901.

Calobata petronella L. Bishop Auckland, five ♂s and one ♀, June-July 1897-1901.

Fam. ORTALIDÆ.

Pteropæctria afflicta Mg. Hesleden, eight ♂s and seven ♀s, Aug. 1899-1902.

Pteropæctria nigrina Mg. Hesleden, one ♀, Aug. 1899.

Pteropæctria frondescentiæ L. Waskerley, one ♂, July 1901; Hesleden, five ♂s and four ♀s, Aug. 1902.

Fam. TRYPETIDÆ.

Acidia cognata W. Bishop Auckland, one ♀, July 1901.

- Acidia heraclei* L. Bishop Auckland, ♂, April 1902.
Spilograpa Zoë Mg. Bishop Auckland, three ♂s and two ♀s, April-June 1902.
Trypeta onotrophes Lw. Hesleden, three ♂s and one ♀, Aug. 1900.
Urophora solstitialis L. Hesleden, four ♂s, Aug. 1902.
Sphenella marginata Fln. Hesleden, one ♂ and three ♀s, Aug. 1900.
Tephrites miliaria Schrk. Hesleden, nine ♂s and one ♀, Aug. 1899-1902.
Tephrites absinthii F. Hesleden, one ♀, July 1899.
Tephrites hyoscyami L. Evenwood, one ♀, June 1897.
Tephrites vespertina Lw. Shull, one ♂, Sept.; Harperley, two ♀s, April 1900.
Tephrites bardanæ Schrk. Hesleden, ten ♂s and two ♀s, Aug. 1902.

Fam. LONCHÆIDÆ.

- Lonchæa vaginalis* Fln. Bishop Auckland, one ♂ and two ♀s, June-July 1900-1901.
Lonchæa chorea F. Bishop Auckland, one ♀, June 1897.
Lonchæa albitarsis Ztt. Bishop Auckland, two ♀s, July 1900-1901.
Palloptera ustulata Fln. Bishop Auckland, three ♂s and five ♀s, July 1900-1901.
Palloptera umbellatarum F. Hesleden, two ♀s, Aug. 1899; Bishop Auckland, two ♂s and six ♀s, June-July 1900-1901.
Palloptera saltuum L. Barnard Castle, one ♀, June 1900; Bishop Auckland, two ♂s and one ♀, June 1902.
Palloptera arcuata Fln. Bishop Auckland, one ♂ and one ♀, June-July 1901; Evenwood, one ♂, June 1897; Harperley, one ♀, June 1900.

Fam. SAPROMYZIDÆ.

- Sapromyza lupulina* F. Bishop Auckland, one ♀, June 1901.
Sapromyza decempunctata Fln. Bishop Auckland, six ♂s and seven ♀s, June-July 1901-2.
Sapromyza pallidiventris Fln. Bishop Auckland, one ♀, June 1901; Harperley, one ♂, July 1902.
Sapromyza obsoleta Fln. Bishop Auckland, two ♀s, July 1900.
Sapromyza rorida Fln. Very common.
Lauxania ænea Fln. Hesleden, Waskerley, Bishop Auckland, six ♂s and six ♀s, June-Aug.

Fam. OPOMYZIDÆ.

- Balioptera tripunctata* Fln. Bishop Auckland, one ♂, 25th Oct. 1901.
Balioptera combinata L. Hesleden, two ♂s and one ♀, Aug. 1900.
Opomyza germinationis L. Common everywhere.
Opomyza florum F. Hesleden, one ♀, Aug. 1899.
Pelethophila flava L. Bishop Auckland, two ♂s and one ♀, July 1900.

Fam. SEPSIDÆ.

- Sepsis violacea* Mg. Bishop Auckland, one ♀, May 1900.
Sepsis cympea L. Everywhere, four males and six ♀s, March-Aug.
Nemopoda cylindrica F. Bishop Auckland, Hesleden, etc., four ♂s and two ♀s, June-Aug.

Fam. PIOPHILIDÆ.

- Piophila casei* L. Bishop Auckland, three ♂s and six ♀s, May-July.

Fam. GEOMYZIDÆ.

- Diastata nebulosa* Fln. Shull, one ♀, Sept. 1900.

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Fam. EPHYDRIDÆ.

Parhydra aquila Flin. Hesleden, three ♀s, Aug. 1899.

Fam. DROSOPHILIDÆ.

Drosophila confusa Stæg. Gibside, one ♀, April 1898.

Drosophila funebris F. Bishop Auckland, one ♂, April 1902.

Fam. CHLOROPIDÆ.

Meromyza læta Mg. Hesleden, three ♂s and six ♀s, July-Aug. 1899-1900.

Centor cereris Flin. Bishop Auckland, one ♀, July 1900; Bedburn, three ♀s, July 1902.

Chlorops didyma Ztt. Hesleden, two ♂s and two ♀s, July-Aug. 1899.

Chlorops scutellaris Ztt. Bishop Auckland, one ♀, July 1901.

Chlorops tæniopus Mg. Hesleden, two ♀s; Harperley, one ♀; Evenwood, one ♀, May and Aug. 1897-1900.

Chlorops læta Mg. Bishop Auckland, three ♂s and one ♀; Belburn, one ♀; May-June 1897-1900.

Chlorops scalaris Mg. Hesleden, one ♀, Aug. 1900.

Chlorops gracilis Mg. Hesleden, one ♀, Aug. 1901.

Oscinis albiseta Mg. Escomb, one ♀, June 1899.

Elachiptera cornuta Flin. Gibside, one ♂ and two ♀s, April 1898; Bishop Auckland, three ♂s and nine ♀s, April, May, and Oct. 1900; Harperley, one ♀, April; Belburn, two ♀s, May 1900.

Fam. AGROMYZIDÆ.

Agromyza pusilla Mg. Bishop Auckland, one ♂, June 1901.

Ochthiphila polystigma Mg. Bollihope, one ♀, June 1901.

Fam. PHYTOMYZIDÆ.

Napomyza lateralis Flin. Hesleden, one ♀, Aug. 1900.

Phytomyza notata Mg. Bishop Auckland, two ♂s, May 1900.

Phytomyza flava Mg. Bishop Auckland, one ♀, July 1900.

Phytomyza fuscula Ztt. Bishop Auckland, five ♂s and four ♀s, Feb. 1900.

Fam. BORBORIDÆ.

Borborus longipennis Hal. Bishop Auckland, three ♂s, May 1900.

Borborus equinus Flin. Very common.

Borborus nigrifemoratus Mcq. Bishop Auckland, one ♀, immature, May 1900.

Borborus geniculatus Mcq. Bishop Auckland, two ♂s and one ♀, March-June 1898-1900; Hesleden, one ♀, April 1901.

Limosina fontinalis Flin. Bishop Auckland, one ♂ and four ♀s, March 1900, Jan. 1902.

Limosina lutosa Stnh. Gibside, two ♂s and one ♀, April 1898; Harperley, one ♂, April 1900.

Limosina pumilio Mg. Hesleden, one ♂, April 1901.

Limosina vitripennis Ztt. Bishop Auckland, two ♀s, May 1900; one ♀, Jan. 1902.

Fam. PHORIDÆ.

Trineura aterrima F. Wearhead, four ♂s, Aug. 1901.

Phora rufipes Mg. Bishop Auckland, four ♂s and four ♀s, April, May, and Oct. 1900.

Phora incrassata Mg. Hesleden, one ♂, Aug. 1899.

Fam. HIPPOSCIDÆ.

Ornithomyia avicularia L. Bishop Auckland, two.*Stenopteryx hirundinis* L. Bishop Auckland, one ; Darlington, one.*Melophagus ovinus* L. Gibside, five.

NOTES.

Mycetophilidæ. I have taken many other species of *Sciara* and *Mycetophila*, but I cannot pretend to name them at present. I shall be very glad to submit them to any reader of this magazine who may feel himself qualified to do so.

Dilophus femoratus Mg. This is not given as British in Verrall's list, although he gives *humeralis* Ztt., which has a black thorax with red humeri. My specimens have the thorax entirely black, and correspond exactly with both Schiner's and Zetterstedt's descriptions of *D. femoratus*.

Orthocladius dolens Wlk. This is as it stands in Verrall's list, but it should be *O. niveipennis* Ztt. I feel sure.

Lonchoptera. The differences between the species are very slight, and I doubt the specific worth of some of the characters. *Trilineata* Ztt. is not in the British list, but my specimens have the three broad stripes on the thorax, which, according to Zetterstedt, easily distinguish it from all others. *Punctum* Mg., with yellow thorax, single dorsal line, and dark abdomen; *lacustris* Mg., the small species with dark thorax; *tristis* Mg., the largest of all, with a dark thorax and dark shining abdomen.

Dolichopus picipes Mg. I take these to be the species meant by *picipes* Mg. in the British List. But if that name is to be restricted to those with very bristly hind metatarsi, then this fly would be *D. fastuosus* Hal.

Syrphus ribesii L. and *vitripennis* Mg. I entirely agree with Mr. Grimshaw's note in *The Naturalist* for 1898, p. 102. And I cannot believe that the minute differences of the 'tiny black bristles' and the dark hind femora in the female constitute any real specific difference. I have females with plenty of black bristles and dark femora, and others with yellow femora and very few black bristles, and there seems to be every gradation between. I do not believe there is any specific distinction.

Baccha elongata F. There is a considerable variation in the amount of dust on the frons, but there does not seem to me to be any dividing line, therefore I put them all under *elongata*. If there be really an *obscuripennis* some of the above may belong to it.

Eristalis æneus Scop. This female is peculiar in having the five light grey stripes on the thorax noted by Verrall in his 'Syrphidæ,' p. 503. There are also two dark slate-coloured, rather broad stripes on each side of the narrow centre light stripe. The two pairs of broad light stripes are broadest in front, disappearing in a point at the suture and reappearing in a narrow stripe behind, until they die out independently a little before the scutellum.

Myiatropa florea L. As the last two dates are early for this fly, it is only right to say that they were caught in a greenhouse. They are larger and much better developed than the other specimens. The Gibsonees ♀ does not exceed 10 mm., the last ♀ is fully 14 mm.

Paraxorista fugax Rnd. and *grossa* R.&R. Neither of these is in Verrall's list. The identification is due to Mr. Wainwright, who was kind enough to look over and name a number of my Tachinidæ for me.

Hyedotesia palida F. These males belong to the variety with grey stripes on the thorax and dark marking on the last two abdominal segments. They were fond of resting on *Pteris aquilina* in a wooded glen.

***Mydea nigritella* Ztt.** This is a doubtful identification. The spur at the inner apex of the hind femora is not present, but otherwise the specimens agree with Zetterstedt's description of *nigritella*.

***Cænusia tricolor* Ztt.** There is no *tricolor* Ztt. in Verrall's list, but he has *tricolor* Meade apparently as a synonyme for *elegantula* Rnd. Meade has no *tricolor* Meade, but has *tricolor* Ztt., under the genus *Hoplogaster*. Herr Stein, of Genthin, assures me that it is certainly *C. tricolor* Ztt., the same as he wrote about in the Wiener Ent. Zeitung for 1897, page 30, and probably the same as Meade's *H. tricolor* Ztt., but different from *C. elegantula* Rnd., which he also confirmed for me.

***Lisporephala alma* Mg.** New to the British list apparently. The identification is Herr Stein's.

***Helomyza ustulata* Mg.** This, I believe, is very rare in England, but it is well marked, and Mr. Collins confirmed my determination. The specimen is now in Mr. Verrall's collection.

***Helomyza parva* Lw.** This is a somewhat doubtful identification as the specimen is in bad condition.

***Phytomyza fuscula* Ztt.** This is not in the British list, but my specimens, which were bred from mined *Cineraria* leaves, agree well with Zetterstedt's description.

NORTHERN NEWS.

The Harrogate Corporation has granted the use of the Winter Gardens for the purposes of a museum.

Mr. E. Hawkesworth has been elected president of the Leeds Geological Association.

A fine female Badger, measuring 3 ft. from nose to tail, was caught near Market Rasen on 25th May, according to 'The Eastern Morning News.'

Mr. T. A. Coward contributes 'Bird Notes from Cheshire during the Winter of 1902-1903' to the May 'Zoologist.'

George Wilkinson, one of the most daring of the 'climbers' at Speeton, and well known to Yorkshire ornithologists, committed suicide early in May.

The 'Sixty-ninth Annual Report of Bootham School (York) Natural History, etc., Society, January 1903,' is to hand. It is pleasing to find a school doing so much to further the study of Natural History. The Report contains much useful information under the heads of Botany, Conchology, Entomology, Ornithology, etc., which should not be overlooked by those interested in these subjects.

Judging from the Report of the annual meeting of the Grimsby Naturalists' Society, recently held, the Grimsby naturalists are in a flourishing condition. This will probably remain so as long as Mr. A. Smith is the secretary.

Notes on Cumberland Coleoptera, by H. Britten, and F. H. Day, appear in the June 'Entomologists' Record.'

The geology of the country near Leicester, by C. Fox-Strangways, has just been issued by the Geological Survey.

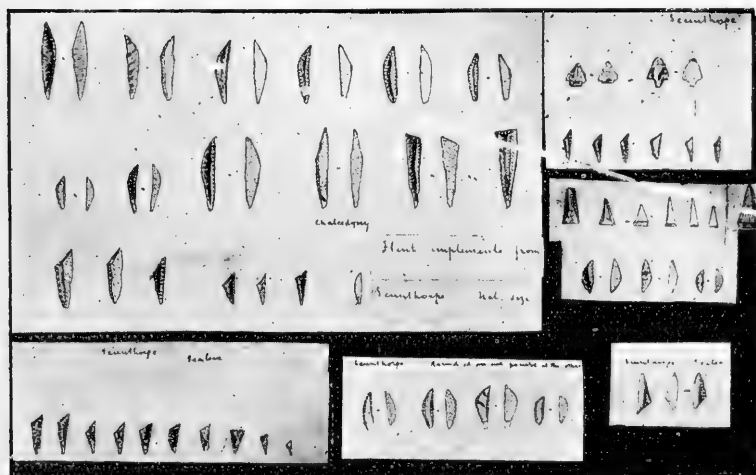
The Annual Report of the Selborne Society refers to the purchase of Brandelhow, on the shores of Derwentwater, by the National Trust; this estate of over 100 acres is now secured for public use.

Messrs. Blackie & Son have published an official Report of the Nature Study Exhibition and Conferences, held at London in July and August last. Besides the reports of the meetings, etc., the book contains the addresses of Prof. Miall and Miss Mary Simpson, of the Yorkshire College, and others well known to our readers.

NOTES AND COMMENTS.

PIGMY FLINTS.

In a recent issue of the 'Field Naturalists' Quarterly,' Mr. A. E. Johnson, in an interesting paper entitled 'Rambles on the Lincolnshire Wold,' once again brings up the question of the 'tiny relics of the Stone Age,' which 'have proved a stumbling-block to scientists.' These are the so-called 'pigmy flints,' minute flakes which occur in quantities 'too great to be classed merely as workshop debris.' Implements they possibly may be, but they are certainly no proof whatever of 'Pigmy man,' and there is no justification for any 'Pigmy man Age'! Those who



Pigmy Implements from Scunthorpe.

have paid particular attention to the relics of the past have not yet found the slightest trace of a pigmy race, and so far not a single bone of a pigmy man is on record. So far, therefore, there is no more evidence of a prehistoric pigmy race in England than there would be to some future archæologist who found a few pins and match-stalks in a twentieth century rubbish heap. We are indebted to the Editor of 'Field Naturalists' Quarterly' for the loan of the block.

PUBLICATIONS OF SOCIETIES

We should like to take the opportunity of urging upon the Editors of Transactions and Proceedings of local field clubs the

importance of printing only such papers and notes as have a bearing upon the natural history, etc., of the district in which the respective club is situated. And, as far as possible, original contributions only should be accepted. The result of an examination of the various annual publications issued by societies in that part of the country covered by 'The Naturalist' is anything but satisfactory. Occasionally such reports consist of lists of officers and members, the titles of lectures, and a balance sheet which explains the meagreness of the report. Others are larger in bulk but of no more value, being made up of abstracts of papers read at the meetings (generally reprinted from newspapers), dealing with every conceivable subject. Such can be of little interest to anyone but the lecturers, if to them. Some publications contain lengthy papers dealing with districts far away from that worked by the society, and in cases where these are original, and of value, the unexpected quarter of their publication renders them frequently overlooked.

SHOULD BE KEPT LOCAL.

Naturalists and others in search of information relating to the geology or flora and fauna of any particular district naturally refer to the publications of the societies situated in that district. In a few cases they are most likely to be satisfied. Will those interested please insist on local and original articles only being published, otherwise the funds of the society will certainly be wasted in publishing useless material. The number of publications issued is already appalling, as the bibliographer knows to his sorrow. But were each to deal with a definite area, their numbers need not be regretted. We would also implore those societies about to commence publishing, not to do so unless there is every probability of the publications continuing. We could readily enumerate dozens of scientific periodicals and Transactions which have come to an untimely end, rendering access to any important papers they may have contained exceedingly difficult.

WHAT NOT TO PUBLISH.

The above heading is suggested by the recent receipt of the Report and Proceedings of a 'Field Naturalists' and Archaeologists' Society,' at an important city in South Lancashire. About forty pages of this are devoted to accounts of field excursions, visits to manufactories, art galleries, etc., etc., some of the places

being very many miles distant from the society's home. All this is apparently the work of the president, who is also editor, leader, botanical referee, lecturer in general, etc. In the whole of this usually well-written matter, little, if anything, can be found adding to our knowledge of the fauna or flora of the proper area for the society's work, and we doubt if even its own members read it all. Two articles are illustrated, one being an account of a 'unique collection of cactaceous plants,' with block from the 'Gardeners' Chronicle'; the other being a description of an excursion to Windermere, illustrated by blocks lent by the proprietor of the hotel at which the party stayed. On one of these the hotel is conspicuously indicated. The remainder of the report is taken up by lists of members, rules, balance sheet, advertisements for ladies' hats, furniture, and other similarly useful information. The price of the volume is not stated, but no doubt it could be purchased. Opinions on the nature of publications may vary, but, personally, we would have preferred seeing a single note recording the occurrence of some unusual animal or plant in the society's area, written by either of its 190 members, rather than the contents of this 56 pp. pamphlet. From a society having an annual income of over £120 we should have expected something more substantial. Under the head of 'expenditure' are some items which, perhaps, account for the present state of affairs. The greatest amount is for 'Fees and honorarium,' for one individual, and another is for '196 teas at Art Gallery Soirée.'

DR. BATHER AND MUSEUMS.

At the fourteenth annual meeting and conference of the Museums' Association, held at Aberdeen in July, the President, Dr. F. A. Bather, delivered an address on 'The Functions of a Museum.' He pointed out that at the present day visitors to museums fell naturally into three classes:—(1) Investigators; (2) students of school or college standing, with whom were joined amateurs and collectors; and (3) the lay public. Experience suggested that the collections in a large museum should be arranged in three divisions: (1) a stored series, accessible only to investigators; (2) an exhibited series, intended for the instruction of students and for the assistance of amateurs, freely open to such really interested people, but denied to the public, and (3) a smaller series of carefully selected objects so displayed as to make the utmost appeal to the general public.

OBSERVATIONS ON ROOKS.

JULIET V. BLACKBURN,
Driffeld.

IN the trees just opposite the room at Driffeld in which I spend much time the Rooks are building. In February, during a spell of warm weather, some young and reckless birds thought it was time to set up housekeeping, and great was the gathering of sticks and quarrelling about eligible sites. But the old birds, with experience of East Riding springs, ruthlessly threw the sticks down again and turned the young couples out of the trees.

During the past winter I have noticed a care for the good of the community which I had not seen before. After the great storms in December a Rook 'Parliament' was held, resulting in all the nests being demolished excepting a few in the most sheltered trees. As yet the tallest trees have no nests in them, though six couples, apparently the same as had their nests there last year, sit in the branches nearly all day and warn off any others that come prospecting round.

During the winter months the Rooks do not sleep in their rookeries, and leave their nests at night. Each pair of Rooks appears to try to be the last to leave. Sometimes they will go off, and quietly return. These tactics were explained when I saw two rooks come hurrying back. They pounced upon an unfinished nest and reduced it to ruins, flinging all the twigs to the ground except two or three which they carried to their own nest.

On another occasion I noticed a Rook steal a tempting twig from a neighbour's nest. The owners were away, but a dozen other Rooks noticed the theft, and he was pecked and hustled about by the community at large until the owners returned and added their quota of abuse.

Among all the busy, happy pairs in the rookery opposite there are two sad and solitary birds, whether bachelors or maidens I cannot say. While the other birds are fetching sticks they sit and gaze enviously at the nests. When the others come back they try to look perky and superior, but only succeed in getting into everybody's way, and finally are ignominiously driven out of the trees, only to return as soon as the busy couples turn their backs.

NORTH OF ENGLAND PSEUDOSCORPIONS.

H. WALLIS KEW, F.Z.S.,

London.

PSEUDOSCORPIONS were known in the South of England in 1665*—42 years before the birth of Linnæus—in Scotland in 1817,† and in Ireland in 1836,‡ yet it was not until 1884,|| as far as I have ascertained, that anything was published concerning them in the North of England. Even at the present time there is a surprising scarcity of information as to their distribution in the northern counties, where we know as yet but seven of the twenty species which have been found in these islands.

My object at present is to call attention to these Arachnids, and to the want of information concerning them; and to ask for co-operation in a study not only of their distribution but also of their life-histories and habits. It is surprising that a number of naturalists state, in reply to inquiries, that they have never seen these animals; and one gathers that without renewed reference to books they cannot even recall their appearance or any facts concerning them. This is the more remarkable since some of our species are common and apparently generally distributed, occurring under stones, among dead leaves, and under bark of trees; sometimes, moreover, they are found in disused stables and other abandoned places where animals or birds have been kept, as well as in old birds'-nests and bee-hives, and even in old houses among papers and objects of natural history. The two outline figures accompanying this paper will give a general idea of the appearance of the creatures; and the key given below will serve for the approximate determination of the species. Reliance on the key alone, however, is not desirable—it might be upset by the discovery of species new to Britain—and thus before deciding on the identity of a specimen one

* R. Hooke, 'Micrographia: or Some Physiological Descriptions of Minute Bodies made by Magnifying Glasses,' 1665, p. 207; Pl. XXXIII., Fig. 2.

† W. E. Leach, 'On the Characters of the Genera of the Family Scorpionidea, with Descriptions of the British Species of Chelifer and Obisium,' *Zoological Miscellany*, III. (1817), p. 51.

‡ R. Templeton, 'Catalogue of Irish Crustacea, Myriapoda, and Arachnida, selected from the Papers of the late John Templeton, Esq.,' *Loudon's Magazine of Natural History*, IX. (1836), p. 14.

|| O. P.-Cambridge, 'Pseudoscorpions New to Britain,' *The Naturalist* X. (1884), p. 103.

must compare it in detail with published descriptions. It is true that all the Pseudoscorpions are small, and have to be specially searched for; but their form is so odd, and their deportment and general proceedings so remarkable, that no one is likely to regret an acquaintance with them; and it would well serve my purpose to attempt to name specimens for readers who may be interested in them. They travel well alive in tubes with a little moss, or dead in tubes of spirit; and may be addressed to me in the care of the Union of London and Smith's Bank, 2, Princes Street, E.C.

The principal works used in the preparation of the key, and of the classified list which follows it, are (1) E. Simon,

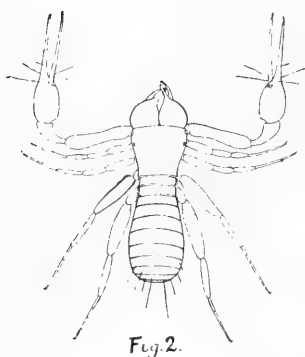


Fig. 2.

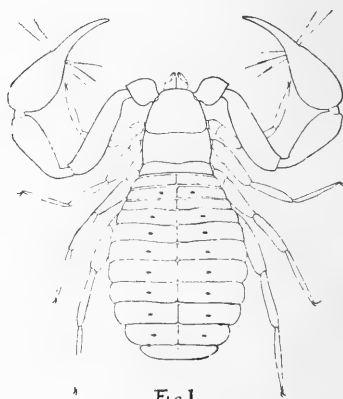


Fig. 1.

Fig. 1.—*Chelifer latreillii*; Fig. 2.—*Chthonius rayi*: two of the Pseudoscorpions (Class: Arachnida; Order Pseudoscorpiones).

Outline diagrams made by the writer from Lincolnshire specimens; much enlarged. The minute structures of the chelicerae, and most of the hairs are omitted.

Chelifer latreillii (Sub-order: **Panctenodactyli**) is known in the north of England in Yorkshire and Lincolnshire; and is found in considerable plenty in the neighbourhood of the coast. *Chthonius rayi* (Sub-order: **Hemictenodactyli**) is known in the north of England in the same counties; and is probably generally distributed throughout the country.

The animals, exclusive of the appendages, are about 3 mm. and 2 mm. in length respectively.

'Les Arachnides de France,' VII. (1879), pp. 1-78; (2) L. Balzan, 'Voyage de M. E. Simon au Venezuela: Pseudoscorpiones,' Annales de la Société entomologique de France, LX. (1891), pp. 497-552; (3) O. P.-Cambridge, 'On the British Species of False-Scorpions,' Proceedings of the Dorset Natural History and Antiquarian Field Club, XIII. (1892), pp. 199-231; (4) H. J. Hansen, 'Organs and Characters in different Orders

Naturalist.

of Arachnids,' Entomologiske Meddelelser, IV. (1893-4), pp. 137-251; (5) Lankester [and Pocock], 'Arachnida,' Encyclopædia Britannica, ed. 10, I. (1902), pp. 519-546. In the case of species with which I am not acquainted, the characters found in the key have been taken without verification from the work of the Rev. O. P.-Cambridge. Some explanation of the terms used may perhaps be necessary; and it may accordingly be stated that the *chelicerae* are the appendages of the first pair, the *pedipalps* those of the second pair, and the *legs* those of the third, fourth, fifth, and sixth pairs. The pedipalps and legs consist of *coxa*, *trochanter*, *femur*, *tibia*, and *tarsus*, the last part being always of two pieces in the pedipalps where its first piece forms the *hand* and *fixed finger*, and its second piece the *movable finger*. In the legs, the femur also may be of two pieces, or it may have a small part—the *trochantin*—more or less separated from it at the base. All the appendages belong to the fore-body, the dorsal covering of which is the *carapace*, while the *tergites* are the plates of the upper surface of the hind-body. As regards the local notes in Section III., it must be explained that the mark ! is used to indicate records which have the authority of Mr. Cambridge's specific determinations; while those for which I am alone responsible are marked with the letter *K*.

My grateful acknowledgments are due to Mr. Cambridge for great kindness in naming specimens, from various parts of England, for many years past.

I. A KEY TO THE BRITISH PSEUDOSCORPIONS.

1. Chelicerae small; carapace rounded in front, with one or two grooves; tergites with median division 3
2. Chelicerae large; carapace truncated in front, without grooves; tergites without median division 23
3. Carapace with one groove; first and second legs without trochantin *muscorum*.
4. Carapace with two grooves; first and second legs with trochantin 5
5. Eyes none 7
6. Eyes two 15
7. Hairs simple 9
8. Hairs clavate... .. 11
9. Hand distinctly longer than broad; fingers equal to hand in length *nodosus*.
10. Hand nearly or quite as broad as long; fingers shorter than hand *insuetus*.
11. Hand very tumid, but slightly longer than broad; fingers equal to hand in length, *cimicoides*.
12. Hand less tumid, distinctly longer than broad; fingers (at least the movable one) a little longer than hand 13

- | | | | |
|-----|---|-----------------------|----|
| 13. | Hairs strongly and uniformly clavate | <i>phaleratus.</i> | |
| 14. | Hairs less strong, many simple | <i>dubius.</i> | |
| 15. | Hairs clavate | | 17 |
| 16. | Hairs simple | <i>latreillii.</i> | |
| 17. | Pedipalps robust | | 19 |
| 18. | Pedipalps long, slender | | 21 |
| 19. | Fingers shorter than hand; hairs on pedipalps mostly obtuse, if any clavate | <i>subruber.</i> | |
| 20. | Fingers equal to hand in length; hairs on pedipalps generally clavate | <i>meridianus.</i> | |
| 21. | Pedipalps much attenuated, with tibia very slightly (if at all) shorter than femur | <i>hermanni.</i> | |
| 22. | Pedipalps generally stouter, with tibia distinctly (not greatly) shorter than femur | <i>caneroides.</i> | |
| 23. | First and second legs with femur of two pieces and tarsus of two pieces; fingers curved... .. | | 25 |
| 24. | First and second legs with femur of two pieces and tarsus of one piece; fingers straight or nearly so... .. | | 33 |
| 25. | Eyes two | | 27 |
| 26. | Eyes four | | 29 |
| 27. | Pedipalps with tibia as long as femur; fingers as long as hand | <i>cambridgii.</i> | |
| 28. | Pedipalps with tibia distinctly shorter than femur; fingers longer than hand... .. | <i>lubricus.</i> | |
| 29. | Fingers short, strong, scarcely equal (or no more than equal) to hand in length | | 31 |
| 30. | Fingers long, less strong, considerably longer than hand | <i>muscorum.</i> | |
| 31. | Hand robust; femur of pedipalps shorter in proportion | <i>sylvaticum.</i> | |
| 32. | Hand less robust, somewhat oval; femur of pedipalps longer in proportion to tibia | <i>maritimum.</i> | |
| 33. | Hand with depression at base of fixed finger; fingers but slightly longer than hand | <i>tetrachelatus.</i> | |
| 34. | Hand without depression; fingers much longer than hand... .. | | 35 |
| 35. | Hand unicolorous with rest of pedipalp; fingers straight | | 37 |
| 36. | Hand deeply coloured; fingers very slightly curved... .. | <i>tenuis.</i> | |
| 37. | Distance between eyes equal to their diameter | <i>orthodactylus.</i> | |
| 38. | Distance between eyes nearly double their diameter | <i>rayi.</i> | |

II. A LIST OF THE BRITISH SPECIES, MARKED TO SHOW THOSE KNOWN IN THE NORTH OF ENGLAND.

Class : ARACHNIDA.

Order : PSEUDOSCORPIONES.

Sub-Order : *Panctenodactyli.*

Family : CHELIFERIDÆ.

Sub-Family : *Cheiridiinæ.*

× 1. *Cheiridium museorum* (Leach), 1817.

Sub-Family : *Cheliferinae*.

- × 2. *Chernes nodosus* (Schr.), 1803.
- 3. *Chernes insuetus* Cambr., 1892.
- × 4. *Chernes cimicoides* (Fabr.), 1793.
- 5. *Chernes phaleratus* (Simon), 1879.
- 6. *Chernes dubius* Cambr., 1892.
- 7. *Chelifer subruber* Simon, 1879.
- 8. *Chelifer meridianus* L. Koch, 1873.
- 9. *Chelifer cancroides* (Linn.) 1761.
- 10. *Chelifer hermanni* Leach, 1817.
- × 11. *Chelifer latreillii* Leach, 1817.

Family : GARYPIDÆ.

[Unrepresented in Britain.]

Sub-Order : *Hemictenodactyli*.

Family : OBISIIDÆ.

- 12. *Roncus lubricus* L. Koch, 1873.
- 13. *Roncus cambridgii* L. Koch, 1873.
- 14. *Obisium sylvaticum* C. L. Koch, 1837.
- 15. *Obisium maritimum* Leach, 1817.
- × 16. *Obisium muscorum* Leach, 1817.

Family : CHTHONIIDÆ.

- × 17. *Chthonius tetrachelatus* (Preys.), 1790.
- 18. *Chthonius tenuis* L. Koch, 1873.
- 19. *Chthonius orthodactylus* (Leach), 1817.
- × 20. *Chthonius rayi* L. Koch, 1873.

III. COUNTY RECORDS AND BIBLIOGRAPHY.

NORTHUMBERLAND.

[Mr. Cambridge (3) mentions having received *Chelifer latreillii* from near Berwick-on-Tweed; but this is probably a mistake for North Berwick (Haddingtonshire), whence Mr. H. Crowther sent specimens to Mr. Cambridge in 1882*.]

* H. Crowther, '*Chelifer Degeerii* C. Koch [= *C. latreillii*], a species new to Britain.' *Hardwicke's Science-Gossip*, XVIII. (1882), p. 277; *Zoologist* (3), VI. (1882), p. 465.

CUMBERLAND.

***Chernes nodosus*.** Carlisle : on the leg of a fly (F. O. P.-Cambridge) !

***Obisium muscorum*.** Carlisle, Armathwaite, Wreay ; common in the woods among dead leaves (F. O. P.-Cambridge) !

DURHAM AND WESTMORLAND.

[No records.]

YORKSHIRE.

***Chernes nodosus*.** Bradford : on the leg of a fly (R. H. Meade) ! Bradford : on the leg of a house-fly (W. West) ! Leeds : in a book in a library (G. Hainsworth) !

***Chelifer latreillii*.** Spurn Point : under a log of wood on the sands (H. E. Johnson) !

***Obisium muscorum*.** Aysgarth : under stones, April 1903 (F. W. Wilson), *K*.

***Chthonius rayi*.** Aysgarth : under stones, April 1903 (H. Wilson), *K*.

LANCASHIRE.

[No records.]

CHESHIRE.

***Chernes nodosus*.** Bowdon : on the leg of a house-fly on a window, August 1894 (T. A. Coward), *K*. Chester : on the leg of a house-fly, August 1899 (E. J. Muspratt), *K*. The specimens are in the Chester Museum.

DERBYSHIRE AND NOTTINGHAMSHIRE.

[No records.]

LINCOLNSHIRE.

***Cheiridium museorum*.** Raventhorpe (J. Beaulah) ! Kirton-in-Lindsey : in great numbers in a deserted sparrow's nest in ivy on a cottage, July 1877 (Dr. George) !

***Chernes nodosus*.** Near Kirton-in-Lindsey : four mounted in a slide (Dr. George) ! Louth : on the leg of a fly caught on the wing in a warehouse, September 1900 (J. Larder) ! Gainsborough : on the leg of a fly on one of the windows in Highfield House (A. P. Burton) !

Chernes cimicoides. Scotton Common: found by Mr. J. Porter under the bark of a willow (H. E. Johnson)!

Chelifer latreillii. Mablethorpe: under bark of dead wood in a fence, October 1886 (H. W. Kew)! Mablethorpe: June 1893 (W. F. Baker). Mablethorpe: under an old boot, August 1900 (R. W. Goulding). Trusthorpe: under pieces of wood (C. S. Carter), *K.* Chapel St. Leonards: plentiful (J. E. Mason)! Saltfleetby St. Clements: under pieces of wood, April 1901 (H. W. Kew), *K.* Cleethorpes, Donna Nook, Saltfleetby St. Clements, Mablethorpe, Trusthorpe, Sutton-le-Marsh, Huttoft, and near Chapel St. Leonards: plentiful, April 1903 (H. W. Kew), *K.* In all cases on or about the sand-hills and warrens of the coast: under objects lying on the sand or sandy soil; under the bark of maimed stumps of Sea-Buckthorn and Elder, and of dead branches in fences, &c.

Obisium muscorum. Welton-le-Wold: among dead beech leaves, April 1901 (H. W. Kew)!

Chthonius tetrachelatus. Tetney: under pieces of chalk in the defences of the sea-bank south of the Haven, April 1903 (C. S. Carter), *K.*

Chthonius rayi. Broughton, near Brigg (J. Beulah)! Kirton-in-Lindsey: under stones in garden (Dr. George)! Trusthorpe: under pieces of wood on the sandhills (C. S. Carter)! North Ormsby: under flints in a chalk-pit (C. S. Carter)! Louth: under stones in garden; Maltby Wood: under a log; Welton-le-Wold: among dead beech leaves; Hubbard's Valley: under pieces of chalk, April 1901 (H. W. Kew), *K.* Torksey: found by Mr. Carter under a lump of gypsum, June 1901 (E. A. W. Peacock). Scunthorpe: found by Mr. Carter under a stone, July 1902 (E. A. W. Peacock). Tetney: with *C. tetrachelatus* as above noted, April 1903 (C. S. Carter), *K.* Louth: under stones in garden in Bridge Street, May 1903 (C. S. Carter).

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- (3) CAMBRIDGE, O. P.- 'On the British Species of False Scorpions.' Proceedings of the Dorset Natural History and Antiquarian Field

- Club, XIII. (1892), pp. 199-231. [*Cheiridium museorum*, Lincolnshire; *Chernes nodosus*, Cumberland and Yorkshire; *Chelifer latreillii*, Northumberland (?) and Lincolnshire; *Obisium muscorum*, Cumberland.]
- (4) ROEBUCK, W. D. The Naturalist, 1893, p. 172. [*Chelifer latreillii*, Mablethorpe.]
- (5) BAKER, W. F. 'Foundation of a Lincolnshire Naturalists' Union.' The Naturalist, 1893, p. 261. [*Chelifer latreillii*, Mablethorpe.]
- (6) GOULDING, R. W. 'Lincolnshire Naturalists' Union at Mablethorpe.' The Naturalist, 1901, pp. 151-4. [*Chelifer latreillii*, *Chthonius rayi*.]
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- (8) JOHNSON, H. E. 'East Riding Pseudoscorpions.' Transactions of the Hull Scientific and Field Naturalists' Club, I. (1901), p. 228. [*Chelifer latreillii*, Spurn.]
- (9) CAMBRIDGE, F. O. P.- 'The Victoria History of the County of Cumberland,' I. (1901), p. 157. [*Chernes nodosus*, *Obisium muscorum*.]
- (10) PEACOCK, E. A. W. 'Lincolnshire Naturalists at Torksey.' The Naturalist, 1902, pp. 133-8. [*Chthonius rayi*.]
- (11) PEACOCK, E. A. W. 'Lincolnshire Naturalists at Scunthorpe.' The Naturalist, 1902, pp. 375-380. [*Chthonius rayi*.]

YORKSHIRE NATURALISTS AT GOATHLAND.

GOATHLAND, Fen Bogs, and Murk Mire Moor were visited by about fifty members and associates of the Yorkshire Naturalists' Union on Saturday, 27th June. Goathland, itself, has recently been 'improved' by golfers, and is assuming the garb of a suburb of a busy city. Once outside the village, however, this aspect is gone, if not forgotten, and typical Yorkshire moors, for the most part in their natural condition, extend for miles and miles, to the great delight of the student of Nature.

The fauna and flora of this wild tract were investigated by a party led by Messrs. J. T. Sewell and W. Ingham. Fen Bogs proved a glorious hunting ground for this section.

The geologists, under the leadership of Mr. P. F. Kendall and the Rev. J. Hawell, visited Murk Mire Moor. Sections were few, and fossils were fewer, and hammers and bags were hardly needed; yet the geologists had a 'field day' such as will not soon be forgotten. They were on ground which has recently been brought prominently before the geological world by the

remarkable investigations of Mr. Kendall* in connection with the lakes formed by the damming up of the valleys by ice during the Glacial Period. From various points during the day's ramble the sites of the old lakes were pointed out, with their accompanying phenomena, the 'overflow channels.' At Castle Hill was perhaps one of the most remarkable examples of erosion met with during the ramble; its extraordinary position and surrounding channels of various heights being readily accounted for on Mr. Kendall's theory. It seems strange that, although the various phenomena upon which Mr. Kendall bases his conclusions have been carefully and accurately mapped for years, their true interpretation has only just been made.

A few erratics were noted on the moors, particulars of which will no doubt appear in the 'Boulder Report.'

After tea, which was held at the Goathland Hotel, Mr. W. Denison Roebuck presided at the general meeting, when reports on the work accomplished were given by the Chairman and Messrs. J. Waddington, M. L. Thompson, W. Ingham, M. B. Slater, P. F. Kendall, and the Rev. J. Hawell. A Viper, which had been secured during the afternoon, was exhibited, and some shells of *Helix nemoralis*, as broken and fed upon by hedgehogs, were also shown.

A few members stayed the week-end in the vicinity, and these assembled on the Saturday evening, under the chairmanship of Mr. E. Hawkesworth to hear the promised papers, 'An Oolitic Plant Bed in North Cleveland,' by the Rev. J. Hawell, and 'The Birds of the Goathland District,' by Mr. T. Stephenson. Both these will appear in 'The Naturalist.'

The following day being even hotter than the first, there was a general disinclination for very much exertion. The morning was spent in the vicinity of Mallyan Spout, where the botanists found plenty to occupy their attention. In the woods close by some of the members made their first acquaintance with the Stink-horn (*Phallus impudicus*), half a dozen being in full growth near an old tree stump. One was gathered for the secretary of the Mycological Committee, but was not carried far! In the afternoon, by the friendly help of a waggonette, some of the outlying parts of the moors were visited. On the heather a large Dragon-fly, identified by Mr. Porritt as *Cordulegaster annulatus*, was secured.

The following reports on results of the excursion have been received:—

* See 'The Naturalist,' January 1903, pp. 14-16.

For the botanical section, Mr. W. Ingham, B.A., writes that the most interesting flowering plants noticed, chiefly in Fen Bogs, were:—*Schollera Occycoccus*, *Ranunculus hederaceus*, *Menyanthus trifoliata*, *Valeriana dioica*, *Comarum palustre*, *Orchis latifolia*, *Habenaria bifolia*, *Drosera rotundifolia*, *Pinguicula vulgaris*, and *Myriophyllum verticillatum* floating in large masses in the stream by the railway line, and accompanied by *Scirpus fluitans*. On the dry moorland was *S. cæspitosus*, and here also, but especially in Fen Bogs, was an interesting variety of Sedges, as follows:—*Carex pilulifera*, *C. sylvatica*, *C. pulicaris*, *C. ovalis*, *C. ampullacea*, *C. paniculata*, *C. fulva*, *C. stellutata*, *C. flacca*, *C. vulgaris*, and *C. pallescens*. The Fen Bogs were also especially rich in the *Sphagna* or bog mosses, the chief being (named according to the new system by Warnstorf) *Sphagnum molluscum*, in fruit; *S. rubellum* vars. *rubrum*, *versicolor*, and *violaceum*; *S. acutifolium* vars. *flavo-rubellum* and *versicolor*; *S. subnitens*, in abundant fruit, with vars. *flavo-rubellum*, *pallescens*, and *versicolor*; *S. teres* var. *imbricatum*; *S. recurvum* var. *amblyphyllum*, in extensive masses in the shallow pools; *S. compactum* var. *imbricatum*, common on dry moorland by the side of the bog; *S. inundatum*, in large masses in the shallow pools; *S. Gravetii*, by side of rill; *S. rufescens*, abundant in the pools; *S. cymbifolium* var. *fusco-rubescens*; *S. papillosum* var. *normale* f. *conferta*, in fruit; and *S. medium* of two vars., *purpurascens* and *glauco-purpurascens*. Vast quantities of *Hypnum commutatum* grow on the steep sides of the bog, as also masses of the hepatics *Scapania undulata* and *Scapania purpurascens*.

Mr. Slater found at Mallyan Spout the mosses *Georgia Browniana* and *Heterocladium heteropterum*, and the hepatics *Harpanthus scutatus* and a rather large form of *Chiloscyphus polyanthos*. This district is extremely rich in all the departments of bryology, due to the wonderfully-varied surface and light, shade, and moisture.

Mr. M. L. Thompson, F.E.S., reports that Mr. H. Ostheide and himself found this upland district a good one for coleoptera, and, with the assistance of Mr. J. T. Sewell, a large number of species was noted. Working over Goathland Moor, many of the common moorland beetles were met with, including the brilliant *Carabus nitens*, so characteristic of our heaths. On arriving at Fen Bogs additional species occurred on the heather, birches, and sallows growing in that locality. The full list is as follows:—

<i>Cicindela campestris</i> L.	<i>Athous hæmorrhoidalis</i> F.
<i>Carabus nitens</i> L.	<i>Adrastus limbatus</i> F.
<i>Notiophilus aquaticus</i> L.	<i>Agriotes obscurus</i> L.
<i>Leistus ferrugineus</i> L.	<i>Agriotes pallidulus</i> Ill.
<i>Nebria brevicollis</i> F.	<i>Dolopius marginatus</i> L.
<i>Dyschirius globosus</i> Herbst.	<i>Corymbites quercus</i> Gyll.
<i>Bradycellus cognatus</i> Gyll.	<i>Cyphon coarctatus</i> Payk.
<i>Bradycellus similis</i> Dej.	<i>Cyphon pallidulus</i> Boh.
<i>Pterostichus madidus</i> F.	<i>Lampyris noctiluca</i> L. (larva).
<i>Calathus flavipes</i> Fourc.	<i>Telephorus lituratus</i> F.
<i>Calathus melanocephalus</i> L.	<i>Telephorus bicolor</i> F.
<i>Olisthopus rotundatus</i> Payk.	<i>Telephorus paludosus</i> Fall.
<i>Bembidium atroceruleum</i> .	<i>Telephorus flavilabris</i> Fall.
<i>Laccobius sinuatus</i> Mots.	<i>Rhagonycha limbata</i> Thoms.
<i>Limnebius truncatellus</i> Thoms.	<i>Malthodes marginatus</i> Satr.
<i>Helophorus brevipalpis</i> Bedel.	<i>Grammoptera tabacicolor</i> De G.
<i>Cercyon hæmorrhoidalis</i> Herbst.	<i>Pogonochærus bidentatus</i> Thoms.
<i>Quedius molochinus</i> Grav.	<i>Lema lichenis</i> Voet.
<i>Xantholinus linearis</i> Ol.	<i>Cryptocephalus labiatus</i> L.
<i>Othius fulvipennis</i> F.	<i>Phytodecta pallida</i> L.
<i>Anthobium torquatum</i> Marsh.	<i>Luperus rufipes</i> Scop.
<i>Adalia bipunctata</i> L.	<i>Lochmæa suturalis</i> Thoms.
<i>Coccinella 10-punctata</i> L.	<i>Haltica ericeti</i> All.
<i>Brachypterus urticæ</i> F.	<i>Crepidodera ferruginea</i> Scop.
<i>Epurea deleta</i> Er.	<i>Crepidodera rufipes</i> L.
<i>Meligethes æneus</i> F.	<i>Otiorrhynchus picipes</i> F.
<i>Meligethes viridescens</i> F.	<i>Strophosomus lateralis</i> Payk.
<i>Enicmus transversus</i> Ol.	<i>Phyllobius urticæ</i> De G.
<i>Byturus tomentosus</i> F.	<i>Phyllobius viridicæris</i> Laich.
<i>Byrrhus pilula</i> L.	<i>Anoplus plantaris</i> Naesz.
<i>Aphodius lapponum</i> Gyll.	<i>Ceuthorrhynchus ericæ</i> Gyll.
<i>Aphodius rufipes</i> L.	<i>Ceuthorrhynchidius troglodytes</i> F.
<i>Geotrupes sylvaticus</i> Panz.	T. S.

FUNGI.

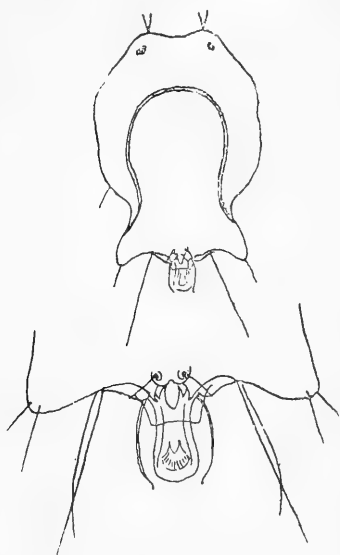
A New British Fungus.—I found a parasitic fungus—*Plasmopara pusilla* (Schröt)—on *Geranium pratense* at Embsay, near Skipton, on Whit-Monday last. This species has not previously been recorded for Great Britain. Since then I have found this fungus in plenty on the same host-plant on the banks of the river Aire near Esholt. This, together with the following, were kindly identified by Mr. Massee, of Kew.—J. E. SUTCLIFFE, Bradford.

A New Host for a Fungus.—During the Whitsuntide holidays I was fortunate enough to find a species of *Plasmopara*, i.e., *P. densa* (Schröt) at Cockit-Moss, Giggleswick, growing on *Rhinanthus crista-galli*, this being a new host-plant for the fungus.—J. E. SUTCLIFFE, Bradford.

LINCOLNSHIRE FRESHWATER MITES.

C. F. GEORGE, M.R.C.S.,
Kirton-in-Lindsey, Lincolnshire.

Arrhenurus leuckarti Piersig. This appears to be one of the rare water mites. It was first described by Dr. Piersig in 1894 in *Zool. Anz.*, v. 17, p. 114. It belongs to that savant's second division of the *Arrhenuri*, i.e., the appendage to the



Arrhenurus leuckarti Piersig.

body is not cylindrical, or like a tail, but broadest at the posterior end, and somewhat narrower where it joins the body, and with a central, projecting petiole arising from its ventral side; in external anatomy it resembles '*A. maculator* Müller' (a figure and description of which may be found in '*Science Gossip*' for December 1882, p. 272); the large, horn-like projections, on the central portion of the posterior part of the back, are united at the base, and only divided at the summit, as in *A. maculator*; the hyaline membrane is also similar to that of '*maculator*,' but the petiole is very different, and forms the easily-recognised distinction between the two mites; in '*macu-*

lator' it is chisel-shaped, with a slightly-curved posterior edge, the external angles being only a little blunt, whilst in '*leuckarti*' it is broadened at the extremity and rounded and without angles, unlike any well-known object I can think of (see lower figure); in colour it is bluish-green. I have not heard of its being found elsewhere in England. Mr. Soar drew the figures from one of my specimens; he also gave me the measurements, which are:—Length of body, 1·12 mm.; breadth of body, 0·72 mm., length of petiole, 0·14 mm.

BIRDS.

Curlew Sandpiper in Durham.—A couple of specimens of the Curlew Sandpiper (*Ancylochilus subarquatus*) were shot on the coast between Sunderland and Seaham on 12th December 1902.—J. W. FAWCETT, Satley, Darlington, 1st April 1903.

Naturalist.

LINCOLNSHIRE GALLS.

REV. EDWARD ADRIAN WOODRUFFE-PEACOCK, L.Th., F.L.S., F.G.S.,
Vicar of Cadney; Hon. Sec. Lincolnshire Naturalists' Union,

AND

MISS S. C. STOW,
Brandon, Grantham.

(Continued from 'The Naturalist,' May 1903, p. 186.)

- Diplosis botularia** Wtz. On *Fraxinus excelsior* L., S. Div. 13, Court Leys, September 1902; Div. 14, Cranwell, 1902; Div. 15, Brandon, September 1902; Sapperton, September 1902, †.
- Diplosis pyrivora** Riley. On *Pyrus communis* (Hezzel Pear of old gardens), N. Div. 3, Cadney Vicarage garden, June 1902, *.
- Dryophanta divisa** Alder. On *Quercus pedunculata*, S. Div. 13, Court Leys, October 1902, †.
- Eriophyes galii** Karp. On *Galium verum* L. and *G. Aparine* L., S. Div. 13, Court Leys, 23rd September 1902, †.
- Eriophyes goniothorax** Nal. On *Cratægus monygra* Jacq., S. Div. 13, Court Leys, 1902; Div. 15, Sapperton, September 1902, †.
- Eriophyes macrochelus** Nal. On *Acer campestre* L., S. Div. 15, Brandon, September 1902, †.
- Eriophyes macrorhyncus** Nal. On *Acer campestre* L., N. Div. 3, Cadney, June 1902, *; S. Div. 13, Caythorpe, September 1902; Haddington, 1902; Div. 14, Cranwell, October 1902, †.
- Eriophyes marginatus**. On *Salix alba* L., N. Div. 2, Bottesford, 1901, *.
- Eriophyes piri** Nal. On *Pyrus communis* (Hezzel Pear of old gardens), N. Div. 2, Bottesford, 1899-1901, *.
- Eriophyes rudis** Canest. On *Betula alba*, N. Div. 2, Bottesford, 1864; Broughton, 1872; Div. 3, Housham, 1891-1902, *.
- Eriophyes similis** Nal. On *Prunus spinosa* L., N. Div. 3, Cadney, 30th August 1902, *; S. Div. 13, Haddington, September 1902, †.
- Eriophyes tiliae** Nal. On *Tilia europæa*, N. Div. 2, Bottesford, 1896; Scawby, 1899, *.
- Eriophyes tristatus** var. *erinea* Nal. On *Juglans regia*, N. Div. 2, Bottesford, 1902, *; S. Div. 13, Court Leys, September 1902, †; Div. 15, Sapperton, September 1902, Thomas Stow.
- Eurytoma hyalipennis**. On *Ammophila arundinacea*, N. Div. 4, Cleethorpes; Div. 9, Mablethorpe; Div. 11, Ingoldmells, and at other places on coast, 1901, *.
- Hormomyia Fagi** Hartig. On *Fagus sylvatica* L., N. Div. 2, Bottesford, 1899-1902, *.
- Livia juncorum** Latr. On *Juncus lamprocarpus*, N. Div. 3, Cadney, 1893, *; Div. 10, Woodhall Spa, October 1901, †; S. Div. 18, Spalding, August 1901, †.
- Mecinus pyrastrer** Herbst. On *Plantago lanceolata* L., S. Div. 14, Rauceby, 13th August 1902, †.
- Nematus gallicola** Steph. On *Salix alba* L., N. Div. 3, Cadney and Housham, *; S. Div. 13, Court Leys, 1902; Div. 15, Brandon, 1902, †; on *Salix Caprea* L., N. Div. 2, Bottesford and Broughton, 1902; Div. 3, Cadney, 30th August 1902, *; on *Salix cinerea* L., N. Div. 2, Broughton, 1902; Div. 3, Cadney, 1902, *; S. Div. 13, Haddington, September, 1902, †; on *Salix fragilis* L., N. Div. 3, Bigby, 1899 and 1902, *.

- Neuroterus lenticularis** Oliv. On *Quercus pedunculata*, S. Div. 13, Court Leys, October 1902, †; Haddington, 29th September 1902, Thomas Stow.
- Neuroterus numismatis** Oliv. On *Quercus pedunculata*, S. Div. 13, Court Leys, October 1902, †; Haddington, 29th September 1902, Thomas Stow.
- Pemphigus bursarius** Koch. On *Populus nigra* L., N. Div. 6, Lincoln, in a garden on High Street, July 1901, †.
- Phyllocoptes acericola** Nal. On *Acer Pseudo-platanus* L., N. Div. 2, Bottesford, 1895-99, *; S. Div. 14, Cranwell, October 1902; Div. 15, Sapperton, September, 1902, †.
- Phyllocoptes fraxini** Nal. On *Fraxinus excelsior* L., N. Div. 2, Bottesford, 1875-1902, *; S. Div. 14, Cranwell, October 1902, †.
- Phyllocoptes Thymi** Nal. On *Thymus Serpyllum* Fr., S. Div. 13, Leadenham, August 1902, *; S. Div. 14, Cranwell, October 1902; Div. 15, West Willoughby Quarry, August 1902, †.
- Polycystis violæ** Bremi. On *Viola sylvatica*, S. Div. 14, Cranwell, October 1902, †.
- Retinia resinella** L. On *Pinus sylvestris*, N. Div. 2, Bottesford Moors, 1874; Broughton, 1893-1900, *.
- Rhodites eglanteriæ** Htg. On *Rosa canina* L., N. Div. 2, Bottesford, 1893; Div. 3, Cadney, 1902; Div. 5, Redbourn, 4th September 1902, *; S. Div. 13, Court Leys, September 1902; Haddington, 1902; Div. 15, Brandon, September 1902, †.
- Rhodites nervosus** Cam. On *Rosa canina* L., N. Div. 8, Cadney, July 1902, *; S. Div. 13, Court Leys, 1902; Haddington, 1902; Div. 15, Brandon, September 1902, †.
- Rhodites rosæ** Htg. On *Rosa canina* L., N. Div. 1, Amcotts, 1877; Eastoft, 1874; Div. 2, Bottesford, 1869; Scunthorpe, 11th July 1902; Div. 3, Cadney, 2nd July 1902, *; S. Div. 13, Fulbeck, 1896, *; Court Leys, 1902; Haddington, September 1902; Div. 14, Cranwell, October 1902; Div. 15, Sapperton, September 1902, †.
- Rhodites rubiginosæ**. On *Rosa rubiginosa*, N. Div. 1, Haxey Turbary, 1899; Div. 2, Bottesford, 1876; Frodingham, 1899, *.
- Rhopalosiphum ribis** L. On *Ribes nigrum* L., N. Div. 2, Bottesford, 1902; Div. 3, Cadney, 1902, *; S. Div. 13, Court Leys, 27th September 1902, †.
- Schizoneura lanigera** Haus. On the orchard apple tree, S. Div. 13, Court Leys, October 1902, †.
- Schizoneura ulmi** L. On *Ulmus montana*, N. Div. 2, Bottesford, 1893; Div. 3, Cadney, 1891-1902, *.
- Trichopsylla Walkeri**. On *Rhamnus catharticus* L., S. Div. 13, Court Leys, September 1902; Div. 14, Cranwell, October 1902; Div. 15, Sapperton, September 1902, †.
- Urophora cardui** L. On *Cnicus arvensis* Hoffm., N. Div. 3, Cadney, August 1900, *.
- Urophora solstitialis** L. On *Centaurea nigra* L., N. Div. 2, Hibaldstow, August 1901, *; S. Div. 13, Caythorpe, October 1902, †.
- Xestophanes potentillæ** Cam. On *Potentilla reptans*, N. Div. 2, Broughton Wood, 16th August 1902, *; S. Div. 13, Court Leys, 25th October 1902, †.
- Eriophyes fraxini** Nal. On *Fraxinus excelsior* L., S. Div. 15, Brandon, 20th September 1902, †.

(Concluded.)

HULL'S CONTRIBUTION TO SCIENCE.

T. SHEPPARD, F.G.S.,

*Secretary of the Yorkshire Naturalists' Union; Curator of
the Municipal Museum Hull.*

(Continued from 'The Naturalist,' July 1903, p. 240.)

George Norman, who died in 1882, belongs to another generation of naturalists, but was one of a hard-working party who flourished in Hull a generation ago. He spent a great deal of his time in his favourite pursuit, entomology; though he was much interested in botany (including the Diatomaceæ) and other branches of natural history, and accomplished some sound work in connection therewith. He spent part of his life in business as a merchant, together with his brother, Mr. T. A. Norman, in Wilberforce House, High Street; but he preferred the country and the study of Nature to crowded thoroughfares and business anxieties. And who would not? So being in comfortable circumstances Norman was able to follow his own inclinations.

In this neighbourhood George Norman collected butterflies and moths, though his most valuable results in this direction were achieved elsewhere. He had certain books, which were his 'working' books, and it is from his numerous notes and records on their pages that we are able to form some idea of what he accomplished.*

It was in Scotland and Canada that Norman accomplished his most valuable entomological work; and as the places he visited were almost new ground at that time, he obtained quite a large number of rare and interesting specimens, several of which were new records for the localities, and in many instances new to science. Some of these were named after him; for example, amongst the Canadian specimens we find *Perigrapha Normanii*, *Agrotis Normaniana*, *Noctua Normaniana*, *Lithophane Georgii*, and *Crocigrapha Normanii*.

Norman's best entomological specimens are now preserved at the British Museum.

* A copy of Stainton's 'Manual of British Butterflies and Moths' is a fair example of the style of Norman's work. Not only are there notes, additional localities, etc., on almost every page, but he has taken photographs (natural size) of a large proportion of the moths described therein, and pasted them in the margin of the book. In some cases there are four or five such photographs on one page.

His most important published work was unquestionably his List of Local Diatoms, three editions of which were issued. This has been of very great service to later workers, and at the time it was first issued it was by far the most important list of its kind in the country.

Although the study of diatoms was such a favourite one with so many naturalists during Norman's time, he was able to make several additions to our knowledge on the subject. Some new species which he found were named after him ; others he named in honour of his friends and fellow-workers, Sollitt and Harrison. For example, there are *Coscinodiscus Normani*, *Pleurosigma Normani*, *Odontidium Harrisonii*, and *Aulacodiscus Sollittianus*.

Norman's excellent microscope and his collection of several hundred slides are now preserved in the Museum in Albion Street.*

Though it is manifest that he took a keen interest in botanical matters, I have not been able to find that he published anything relating to that subject. He has, however, supplied others with material. He had a great liking for ferns, exotic and British, and had a very fine collection of the former in his greenhouses. A great number of the excellent illustrations in Lowe's 'Ferns, British and Exotic' (8 vols., 1855-1860), are from specimens supplied by Norman, and the author states he is indebted to him 'for many plants and fronds of rare ferns, as well as for the loan of several valuable foreign works upon the different Filices.'

That he also did some work amongst the local plants is only what we might have expected. Fortunately, his records, in his own handwriting, are preserved in two books—'The Botanist's Manual' (Sheffield, no date), and Baines's 'Flora of Yorkshire.' This latter contains Norman's dated signature (1845), and the records will presumably date from that time. Mr. J. F. Robinson has carefully examined both books, and finds that in many cases Norman's records are the earliest for several East Riding plants, whilst in others they are additions to the East Riding Flora.

Between 1843 and 1864 Norman regularly contributed to the 'Zoologist' particulars of the local occurrences of uncommon mammal, bird and fish.

Contemporary with him were Robert Harrison and J. D. Sollitt, both able naturalists, who indirectly accomplished much work in connection with the Literary and Philosophical Society

* Of the value of these probably no one can speak with more authority than Mr. R. H. Philip, who has spent many months in examining them.

Naturalist,

and other local institutions. Harrison was the honorary Curator of the Hull Museum, and by his energy many notable local natural history specimens were secured for the collections. Both Harrison and Sollitt were enthusiastic diatom hunters, as already pointed out, and if the naming of new species in their honour goes for anything, they have at any rate been inscribed on the permanent annals of science.

Reference should be made to the two Aldersons—father and son. Of John Alderson (1758 to 1829) Charles Frost wrote:—‘The name of this much valued individual cannot be mentioned in connection with literature and science without combining with it a grateful recollection of his endeavours, on every occasion, to place this town at least on a level with other large towns in the scale of intellectual as well as commercial importance, by impressing on the minds of the rising generation the necessity of mental exertion and of encouraging liberality of sentiment and conduct.’ Though not a native of Hull, the best part of his life was spent there. The first stone of the Mechanics’ Institute was laid by his hand. He was the first president of that institute, as also of the Literary and Philosophical Society. In 1802 he made a great effort to establish a commercial college at Hull, which, however, fell through.* Some of his papers have already been briefly referred to in these notes. His first production was an essay on ‘The Nature and Origin of the Contagion of Fevers,’ printed in Hull in 1878. Like Spence, he contributed papers to the Holderness Agricultural Society, Alderson’s notes printed in 1802 being on the improvement of poor soils. To him a statue was erected, which is now in front of the Hull Infirmary.

The fourth son, James, succeeded his father in practice, and in addition to various technical papers on diseases of the heart, etc., wrote one of local interest in 1825, namely, an ‘Account of a Whale of the *Spermaceti* tribe cast on shore on the Yorkshire Coast on the 28th April, 1825.’ This was printed in the Transactions of the Cambridge Philosophical Society.

Reverting to the Botanical Gardens for one moment, the success which these for a time enjoyed was greatly due to the

* At this Alderson was greatly disappointed, and we find him stating that ‘so cold and indifferent were all the higher ranks who were addressed on that subject that I had no small occasion for the good opinion of my literary friends, to moderate the effects of the mortification I was made to feel.’

work of James Craig Niven (1828 to 1881). His appointment at the Hull Gardens gave him an opportunity of laying them out in such a manner that they were of the greatest possible service to the botanists of the country. In 1866 a catalogue of the hardy herbaceous and Alpine plants then in cultivation numbered upwards of 6,000 species, and took rank as one of the most extensive in the country, a fact of which the town at that time might well be proud. Niven also lectured at the Hull School of Medicine, and his interesting discourses resulted in much good botanical work being accomplished. To Varley's botanical magazines Niven contributed extensively, and he edited a re-issue of Maund's 'Botanical Garden,' in six volumes. He did all in his power to encourage the poorer classes to cultivate plants, even when the space at their disposal consisted of nothing more than the windows and window sills. The matter was taken up in earnest by the working classes, and to aid them Niven issued a very useful pamphlet, 'Instructions for the Growth of Plants and Bulbs in Windows.'

The foregoing is by no means an absolutely complete record of Hull's best scientific worthies and their work, but the chief ones have been enumerated. Perhaps a more living interest would be attached to these notes if a brief reference were made to the scientific work now being accomplished in the town. Of the local scientific societies mention has already been made, and whilst these have long lists of members, it by no means follows that they all can be looked upon as hard workers. As in the case of so many similar societies, the bulk of the work falls upon the shoulders of a few, and the very existence of the societies depends upon the exertions of these.

Perhaps the most substantial contribution to local scientific literature that has been made recently is 'The Flora of the East Riding,' published a few months ago. This was compiled by Mr. J. F. Robinson, who at present holds the position of President of the Hull Scientific and Field Naturalists' Club. Mr. Robinson has been connected with local scientific societies for many years, and his work contains a complete account of the various plants to be found in the East Riding, prefaced by chapters on the Physiography, Topography, and Meteorology of the district. The volume extends to over 250 pages, and is the result of many years' practical work in the field.

Another remarkable production made its appearance in 1901 through the efforts of Mr. R. H. Philip, who has also been through the presidential chair of the local Field Club. This

was an account of the 600 odd species of microscopic forms of life known as Diatoms, written in conjunction with Mr. F. W. Mills, F.R.M.S., and was based on the list formerly printed by George Norman. This is unquestionably one of the finest local lists ever issued, and has the unique feature of an illustration of every species enumerated. Again on the Natural History side, Mr. E. W. Wade, an enthusiastic ornithologist, has issued an account of the 'Birds of Bempton Cliffs,' illustrated by numerous photographs taken by himself whilst dangling at the end of a rope over the edge of those steep chalk cliffs. Of the working-man type of naturalist, Hull has a local 'Thomas Edwards' in Mr. J. W. Boulton, a working stonemason. Mr. Boulton has taken a great interest in entomology, and the enthusiastic manner in which he has pursued his hobby reflects every credit upon him. Though the nature of his occupation necessitates his being at work at very early hours, this does not debar him from frequently being out even still earlier in search of his winged friends, nor prevent him from spending all night in the woods 'sugaring.' His collection at the present time is an exceedingly valuable one, and it is perhaps worth mentioning that some years ago he supplied the Yorkshire College with a very fine series of British lepidoptera. He has prepared an account of the lepidoptera of the Hull district.* Other Hull writers who have contributed to local natural science are: Mr. H. M. Foster, a scientific angler; Mr. N. F. Dobrée, who has devoted his attention to the Noctuæ; Messrs. T. Stainforth and H. E. Johnson, enthusiastic coleopterists; Mr. T. Audas, a vice-president of the local Field Club and an enthusiastic ornithologist; and the late C. W. Russell, another 'working-man' naturalist, who was the first to give an account of East Yorkshire coleoptera, and whose exceptionally fine specimens now adorn the local collection in Albion Street.

In the geological field, Mr. J. W. Stather, the secretary of the local Geological Society, has accomplished much good work, a small proportion of which has been placed on record in the Transactions of his Society. In the same publication will be found notes by Dr. Walton, Mr. W. H. Crofts, and others on interesting local geological topics.

The names just enumerated by no means represent a complete list of the local workers in natural science. There are others equally enthusiastic, although they have preferred using

* This has been printed in the Transactions of the Hull Scientific and Field Naturalists' Club.

their influence in the encouragement of others rather than publishing papers on their own account.

No account of Hull's place in science would be complete without a brief reference to the extraordinary extent to which the commercial world is at last realising how necessary it is to keep abreast with the times. The large manufactories, ship-building yards, etc., for which Hull is so famous are recognising to the full the advantages to be derived from having properly trained scientific workmen. The paint, oil, soap, and other industries are more and more alive to the importance of having properly trained analysts. Electricians are daily increasing in numbers in the manufactories, workshops, and municipal undertakings, and the day is not far distant when, at any rate from a commercial aspect, Hull's scientific attainments will equal those of any other provincial city. The present excellent Technical Schools, Hymers College, Grammar School, and Higher Grade Schools, and even the public elementary schools, are paying more attention to the scientific training of the scholars, the result of which cannot but be beneficial to the whole community. The pity is that the importance of this training was not appreciated more in former years. From the commercial aspect, therefore, we have every reason to be hopeful for the future of Hull's scientific position; but with regard to the natural sciences it is highly probable that any progress made will be due principally to the individual efforts of enthusiastic naturalists. It is hoped, however, that the opening of the public Museum last year, and the course of instruction now being given there to scholars, may prove advantageous, and may do a little towards demonstrating to Hull's future citizens the truth of Wordsworth's words—

‘To the solid ground
Of Nature trusts the mind which builds for aye.’
(*Concluded.*)

AN OOLITIC PLANT BED IN NORTH CLEVELAND.*

REV. J. HAWELL, M.A., F.G.S.

I HAVE recently been engaged in investigating certain plant-bearing beds in the North Cleveland area, and possibly some account of the results of the work may not be without interest.

Some years ago my friend Mr. J. M. Meek, of Redcar, brought me some specimens of fossil plants which he had

* Read at the Goathland Meeting, 27th June 1903.

Naturalist,

obtained from the northern face of the Upleatham outlier. They consisted mainly of portions of fronds of *Williamsonia* and *Teniopteris*, and interested me greatly, since the rock seemed full of the plants laid one upon another, whilst I had previously never met with more than a very few badly-preserved specimens of *Williamsonia* foliage, and none of *Teniopteris* or of any other plant except *Equisetites columnaris* in the whole of the Lower Oolitic area of Cleveland. I was anxious, accordingly, to know the precise spot from which these interesting plants had been obtained, but Mr. Meek's description of the locality did not enable me to find it. A little more than a year ago, however, Mr. Meek very kindly accompanied me to the place, and we obtained several specimens. Shortly afterwards, having obtained permission from Lord Zetland's agent to investigate further, I took a man with me to help to work out the specimens, and on that and various subsequent occasions we obtained more specimens than we could bring away, and I have now a large amount of material.

The locality from which Mr. Meek obtained his plants, and from which most of my specimens have been derived, is the old Marske Quarry, situate one mile due south of Marske, and about 500 feet above sea level. The first specimens which I obtained, and the great majority of those which I have since collected, have been derived from a spoil heap at the west end of the quarry, consisting of material thrown aside by the workmen whilst uncovering the sandstone which formed the *raison d'être* of the quarry. According to the six-inch geological map the section at the point consists of—Carbonaceous shale 15 feet, coal 2 inches, sandstone 20 feet. I have not observed the two inches of coal, and the base of the sandstone is not visible, but the measurements may be taken as approximately correct. The surface of the sandstone is, however, very irregular, and the stone itself is current-bedded, and so much sprinkled with ferruginous nodules, mostly concretionary, and varying in diameter from half an inch to half a foot, that I believe the working of it at this point ceased more than twenty years ago. The plants are mainly in the 'Carbonaceous shale' overlying the sandstone, and occur in the greatest profusion immediately above it, in what would much more appropriately be termed *ferruginous* shales. In fact, the best specimens have been obtained from a somewhat shaly or at least fissile ironstone, so compact and tenacious that blocks 18 inches in length and about 6 inches in thickness have been obtained from the spoil heap

after lying in it for twenty years or more within a foot or two of the surface, still in good unweathered condition.

Although I have so far obtained my largest and finest specimens from the spoil heap, I have been able to trace the plant-bearing shales right round the quarry. Here and there concretionary box-stones occur in lines or otherwise, and pretty plant-impressions may be found on these boxes. Near the east end of the quarry the thickness of shale remaining is small, and it is covered by glacial drift, and apparently disturbed to a small extent by the passage of the glacier. It is not improbable that in the glacial deposits to the south-eastward ferruginous shales with plant remains may be found which could be referred with some amount of probability to this hillside as their place of origin.

With the help of Mr. A. C. Seward's valuable monograph on the Jurassic Flora of Yorkshire and other works I was able to identify most of the plants obtained on the occasions of my first two or three visits, but one plant appeared to be quite distinct from any species of which I could find figure or description. I therefore wrote to Mr. Seward to ask him if he would kindly look at it. He very kindly expressed his willingness to do so, and accordingly I forwarded specimens of the supposed novelty, taking the opportunity to send at the same time other specimens, of some of which I was desirous to have his confirmation of my determination.

After having looked through the parcel he wrote on 16th December last, 'I have looked over the specimens of plants with much enjoyment; they are, many of them, exceedingly good, and the preservation of venation and other characters is unusually perfect. . . . The most interesting type, represented by two or three specimens, is *Dictyozamites*—a genus not hitherto found in Britain and, speaking from memory, confined to India, Japan, and Bornholm.' Mr. Seward also expressed his desire to describe some of the specimens, and it was ultimately arranged that he should write for the Geological Society of London a paper on *Dictyozamites*, and that I should prepare a paper on the other plants and the plant-bed generally. Mr. Seward's paper was read on 25th February last.* He has paid me the compliment of naming the new species *Dictyozamites Hawelli*. He pronounces it to belong to Nathorst's group of the *Cycadophyta*. It was probably a Cycad, but there is so far

* See Quart. Journ. Geol. Soc., No. 234, 1903, pp. 217-233, for detailed description of the species.

nothing to show whether it belongs to one or other of the two subdivisions *Cycadales* or *Bennettitales*.

Of the genus *Dictyozamites* only two species were previously known, *Dictyozamites falcatus* from the Rajmahal series of India, and *D. Johnstrupi* from Bornholm. Of *D. falcatus* two varieties, var. *distans* and var. *grossinervis*, have been recorded from Central Japan. The cropping up of this genus in rocks of approximately the same age in areas of the earth so widely sundered is of extreme interest. Mr. Seward in his very valuable and suggestive paper shows how this Lower Oolitic flora as a whole has a remarkable similarity of character over a great portion of the world's surface, a fact which had not previously been at all adequately realised, in great measure owing to the circumstance that the same genera and species, or genera and species most closely related, have in different regions received entirely different names.

This world-wide sameness of the Jurassic flora is in strong contrast not merely with the wide differences between the vegetation existing in different parts of the world during the Tertiary epoch, but also with the like state of things existing during Palæozoic time. It is even possible to trace the origin of this Jurassic flora to the Permo-Carboniferous *Glossopteris-flora* of the Southern Hemisphere, while the origin of the Tertiary and recent floras are at present entirely untraceable.

I have presented the two figured specimens of *Dictyozamites Hawelli* to the South Kensington Museum, but very recently I have obtained from Marske a specimen of the species which is in most respects better than the figured types. In developing this I came upon a specimen of *Ginkgo digitata*—the first example of that species which has occurred to me. To develop the *Dictyozamites* farther would be to destroy this interesting specimen, and therefore I propose to leave it as it is until I come upon another specimen of the *Ginkgo*.

The species which I have so far identified from Marske—with the help of Mr. Seward—are the following:—*Teniopteris vittata* Brong., *T. major* L.&H., *Williamsonia gigas* L.&H., *W. Pecten* Phill., *Nilssonia tenuinervis* Nath., *N. mediana* Leck., *N. compta* Phill., *Dictyozamites Hawelli* Seward, *Sagenopteris Phillipsi* Brongt. var. *major* Seward, *Otozamites Feistmanteli* Zigno, *O. parallelus* Phill., *Equisetites columnaris* Brong., *Cladophlebis denticulata* Brong., *Ginkgo digitata* Brong., *Gymnosperm Seed* (Beania?). There are probably one or two others which are so far undeterminable.

Some of these have been recorded both from the Lower Estuarine plant bed of the Yorkshire coast and from the plant bed of the Middle Estuarines, viz.:—*Equisetites columnaris*, *Tæniopteris vittata*, *Williamsonia pecten*. It appears as though the general facies of the Marske plants had more in common with that of the flora of the Middle Estuarines of Gristhorpe and Cloughton than with that of the plants recorded from the Lower Estuarine Series of Hayburn Wyke, Staintondale, Saltwick, and Whitby. I believe the only two species in my list which are named in Mr. Fox-Strangway's list from the Lower Estuarines, and are not in the Middle Estuarine List, are *Otزامites parallelus* and *Williamsonia gigas*, while in his list from the Middle Estuarine Beds occur the names of *Sagenopteris Phillipsi*, *Nilssonina compta*, *N. mediana*, *N. tenuinervis*, *Tæniopteris major*, and *Ginkgo digitata*, none of which are recorded from the Lower Estuarines. I cannot find that *Nilssonina* has been recorded at all from the Lower Estuarine Series of Yorkshire, and specimens are extremely plentiful at Marske.

This question needs much more investigation than I have so far been able to give to it, and it is possible that I may be able to trace a succession of plant horizons at Marske. I am inclined to believe, however, that the same plants were living in the neighbourhood throughout the Estuarine period, and that further investigation will show that most of the plants which have so far been found only in the upper or the middle division are really common to both. I was disposed to think that the Marske plant bed was probably below the horizon of the Ellerbeck marine bed, which has not been traced on the Upleatham outlier, and almost certainly of the age of the Lower Estuarines, but at present I have an open mind on the subject, and it may ultimately seem probable—for I doubt whether we can *prove* one thing or another—that it was contemporaneous with both. I hope to be able to trace this bed, or at least beds more or less contemporaneous with it, over other portions of the Cleveland moorland area. Plants occur in other localities apparently on much the same horizon, and some of these localities I propose to visit soon and try to work out a probable theory as to the conditions which prevailed when these plants were deposited, apparently in quiet lagoons or channels, separated temporarily from the neighbouring sea where tides and currents made perpetual motion.

The splendid state of preservation of many of the Marske plants encourages me to hope that evidence of considerable

value in more than one direction may be obtainable. In one case I found a leaf of *Williamsonia pecten* bored by some organism. On another slab I have obtained a suggestion that Seward's variety *major* of *Sagenopteris Phillipsi* may really be a distinct species of *Sagenopteris*, even if it is a *Sagenopteris* at all.

REVIEWS AND BOOK NOTICES.

A List of the Lepidoptera found in the Counties of Cheshire, Flintshire, Denbighshire, Carnarvonshire, and Anglesea. By George O. Day, F.E.S.

We hail with much pleasure the appearance of another northern local list of lepidoptera. As its title implies, the area included is large—no less, indeed, than 2,878 square miles; and what strikes one at once is the comparatively small number of localities mentioned for so large an extent of country, for while some districts have evidently been fairly well worked, in large tracts little or nothing seems to have been done. The list as a whole makes a fairly good show, but undoubtedly a great many species which must occur still remain to be discovered and chronicled. We are at a loss to understand, however, why our author has recorded several species, universally acknowledged as distinct, as varieties. *Cidaria russata* and *C. immanata* are bracketed together as one; and the same applies to *Oporabia autumnata* and *O. filigrammaria*, to *Eupithecia succenturiata* and *E. subfulvata*, and to *E. innotata* and *E. fraxinata*. For these errors there is no excuse, and the last two especially, except in a somewhat close resemblance in the imago stages, have nothing whatever in common, the larvæ not even belonging to the same group of Eupithecian larvæ. And, in Yorkshire at any rate, no one who knows *C. russata* and *C. immanata* well, can have the slightest doubt as to their distinctness. It is possible that *O. autumnata* may not be a specifically distinct species, but even in that case it would, we consider, not be a form of *filigrammaria*, but of *dilatata*. We think, too, that a mistake has been made in adopting the nomenclature of Standinger and Rebel, as it is altogether strange to British lepidopterists, and is not at all likely to be extensively used by the present generation of students. Who, we wonder, would ever recognise in *Tephroclystia goosensii* our little friend *Eupithecia minutata*; or in *Agrotis primula* our equally familiar *Noctua festiva*? And there are dozens of similar cases. The absurdity is forcibly realised when we find *Deilephila galii* changed to *D. gallii*! As the species takes its name from its food plant, *Galium*, it is obvious that a mere misprint has been followed. We notice, too, that the variety *fusca* of *Hybernia progemmaria* is given on the authority of Harrison, whereas we were present ourselves when the form was first brought forward and named by Mr. S. L. Mosley. We have seen this mistake elsewhere.

The list, which is well got up and clearly printed, is issued under the auspices of the Chester Society of Natural Science; and notwithstanding what we consider to be its defects, it will be of the greatest value to lepidopterists working in the area treated of, and to all interested in the geographical distribution of our British lepidoptera. We heartily congratulate the Chester Society on its production.—G. T. P.

The fourth quarterly record of additions to the Hull Museum (Publication No. 13, one penny) has just been issued. It contains an illustrated account of the large striated boulder just placed in front of the Museum, and particulars of antiquities, etc., added to the collections during the three months.

FIELD NOTES.

MOLLUSCS.

Mollusca at Caistor, Lincolnshire.—The following is a complete list of the mollusca noted at Caistor on the excursion of the Lincolnshire Naturalists' Union on 28th August 1902:—

- Arion ater* Crosby Pond, Hundon, and Pelham Wood.
Agriolimax agrestis. Common everywhere.
Vitrea (Hyalinia) cellaria var. *albina*. Pelham Wood.
Pyramidula (Helix) rotundata. Pelham Wood.
Vallonia (Helix) pulchella. Pelham Wood.
Helix aspersa. Croxby, Hundon.
Helix nemoralis var. *libellula*. Hundon, Pelham Wood, Nettleton.
 Var. *rubella*. Hundon, Pelham Wood.
Helix hortensis var. *lutea*. Hundon.
Helicigona (Helix) arbustorum. Croxby, Hundon, Pelham Wood.
 Var. *minima*. Hundon.
 Var. *flavescens*. Hundon, Pelham Wood.
 Var. *alpestris*. Pelham Wood.
Hygromia (Helix) rufescens. Hundon, Pelham Wood.
 Var. *albocincta*. Hundon, Pelham Wood.
Hygromia (Helix) hispida. Nettleton, Hundon, Pelham Woods.
 Var. *hispidosa*. Nettleton, Pelham Wood.
Helicella (Helix) caperata. Pelham Wood.
Helicella (Helix) itala. Rothwell, Caistor.
Helicella (Helix) virgata. Croxby, Thorseway, Caistor.
Buliminus obscurus. Nettleton, Pelham Wood.
Pupa muscorum. Nettleton.
Cochlicopa lubrica var. *ovata*. Pelham Wood.
Succinea putris. One, Hundon.
Succinea elegans. One, Caistor.
Limnea peregra. Hundon.
Physa fontinalis. Croxby Pond.
Velletia lacustris. Croxby Pond.
Sphærium lacustre. Croxby Pond.
Pisidium fontinale. Croxby Pond.
Pisidium pusillum. Caistor.
Pisidium obtusale. Croxby Pond.
Pisidium nitidum. Croxby Pond.
Planorbis albus. Croxby Pond.

—C. S. CARTER, Louth.

Mollusca at Grantham.—Of the 67 species of Mollusca noted at Grantham on the occasion of the excursion of the Lincolnshire Naturalists' Union on 30th July 1902, the following, which have been verified by Mr. J. W. Taylor, are the best:—
Arion circumscriptus, Great and Little Ponton; *Limax flavus*, Court Leys; *Vitrea radiatula*, one at Great Ponton; *Helicigona lapicida* (dead), Great Ponton; *Helicella cantiana*, High Dyke, Great Ponton; *Pyramidula rupestris*, Great Ponton, on Lincoln-

shire limestone wall top; *Vertigo pygmaea*, Little Ponton; *Balea perversa*, Hall's Hill; *Cæcilioides acicula*, one on railway embankment, Little Ponton; *Planorbis albus*, Grantham canal; *P. vortex*, river Witham at Grantham; *Pisidium henslowianum*, one, Grantham canal; *Unio tumidus*, Syston Lake; *Dreissensia polymorpha*, Grantham canal.—E. A. WOODRUFFE PEACOCK, Cadney, September 1902.

Nest and Eggs of *Limax flavus*.—On the 6th July my friend Mr. R. Deans, of 126, Woodhouse Lane, Leeds, showed me a cluster of thirteen eggs in a shallow depression on the surface of some earth in a wickerwork basket used for growing a plant. The depression was most evidently excavated for the purpose, oval or squarely oval in shape, about half an inch in depth, two inches long, and about an inch wide. The eggs were symmetrically oval with both ends blunt, about 6×4 mm., clear and translucent. There were slime tracts on the basket, and I asked Mr. Deans what kind of slugs he had in his back garden. He said they were large ones, whitish in colour. Search was made, and at once resulted in finding an example of *Limax flavus*, the Cellar-Slug, with the usual markings but very pale colour, being indeed ochre-white rather than the usual strong amber-yellow tinge. I record these notes, partly because it is so seldom we have any such records, partly because of the early date, the Continental authors usually giving it later, in August and September.—W. DENISON ROEBUCK, Leeds, 15th July 1903.

***Limax cinero-niger* at Careby, Lincolnshire.**—Among other mollusca taken at the Careby meeting of the Lincolnshire Naturalists' Union was *Limax cinero-niger* from below the bark of a dead tree in the old camp moat. It is a new record for S. Lincs. 53.—E. ADRIAN WOODRUFFE PEACOCK, Cadney, Brigg.

◆◆◆ FLOWERING PLANTS.

Lincolnshire Plant Records.—*Eriophorum vaginatum*, near the now dry duck ponds on Scotton Common, on peat, April 1903, by the Rev. W. W. Mason and myself. Peck records it for the Isle of Axholme in 1815; Mr. F. A. Lees for Linwood in 1878. There are no other records. *Poa compressa* var. *subcompressa*, on wall top on Cornbrash, 26th July 1899, Dorrington, Rev. W. W. Mason. *Poa compressa* var. *polynoda*, on wall top, Lincolnshire Limestone, Wilsthorpe, 19th June 1901, Rev. W. W. Mason. These have remained unnamed till the last few weeks.—E. A. WOODRUFFE-PEACOCK, Cadney, Brigg.

NORTHERN NEWS.

A batch of useful 'Notes from the Manchester Museum' has been forwarded to us by the Director, Mr. W. E. Hoyle, M.A., D.Sc. This consists of reprints of papers dealing with specimens in the Museum, etc., by Professor W. Boyd Dawkins, Mr. J. Ray Hardy, and the Director. Two of the publications, dealing with Manx Geology (reprints of papers in the Quarterly Journal of the Geological Society), are of particular interest to our readers.

North Lincolnshire has recently lost its oldest naturalist in Charles Scoffin Holgate, J.P., farmer, of Low Risby, Roxby. He was born in 1819, and was a keen and observant naturalist, as well as sportsman, throughout his life. He was a gentleman decoyman, being a master of the art of securing wild fowl by strategy. He had a fine collection of North Lines. Lepidoptera, but unfortunately the specimens are not dated and localised.

Mr. T. Aveline, F.G.S., one of the earliest field geologists attached to the staff of the Geological Survey, died in May last. His principal geological work was accomplished in the Lake District.

Mr. C. T. Clough has a paper in the June 'Geological Magazine' entitled 'The Disappearance of Limestones in High Teesdale.'

The annual report of the Nottingham University College Free Public Libraries and National History Museum Committee for 1902-3 records the recent gift of an extensive series of skins, skeletons, skulls, and horns of South African mammals, presented by Lieut.-Col. Birkin, D.S.O.

The occurrence of the Pintail inland in Cheshire, and of the Dotterel at Sealand, in the same county, is recorded in the June 'Zoologist.'

Mr. J. W. H. Harrison records *Vespa austriaca* for Durham in the July 'Entomologists' Record.'

Entomologists will be pleased to notice the advertisement on the cover relating to the issue of a second edition of Porritt's Yorkshire Lepidoptera. Since the first edition in 1883 much additional information has been accumulated by the author which will be included in the new edition. Intending subscribers should send in their names at once. The price will be 6s. 6d.

We would also draw attention to the opportunity of purchasing the Transactions of the Yorkshire Naturalists' Union at greatly reduced cost as set forth on the cover. These transactions include most important papers and memoirs relating to Yorkshire. Full particulars of the contents of each part can be obtained from the Secretary of the Union, Hull.

A revised syllabus of lectures for the winter, in connection with the Y.N.U. lecture scheme, is in preparation, and will shortly be obtainable from the Secretary.

A full-grown male Beluga (*Delphinapterus leucas*) was captured at the mouth of the Tyne on June 10th.

The third field-day of the Durham County Naturalists' Union was held at Stanhope and Wearhead on Saturday, 11th July. Sixty-eight members attended in spite of most unfavourable weather. Attention was devoted chiefly to geology, under the leadership of Messrs. Watson, Peart, and Thompson, and visits were paid to Burtree-ford, Cophill Quarry, and the Sedling Mine. Later in the day, under the guidance of Mr. Hull, the party proceeded to Rogerley Quarries and Frosterley, where numerous specimens were found of Corals, Crinoids, Brachiopods, and Cephalopods. After tea the Secretary (Rev. W. J. Wingate) read, for Mr. W. M. Egglestone, an interesting paper on the rocks of the district, with special reference to the Whin Sill.

In the July 'Zoologist' the White Wagtail is recorded in the Isle of Man, and the Rough-legged Buzzard and Montagu's Harrier in Derbyshire.

Naturalist.

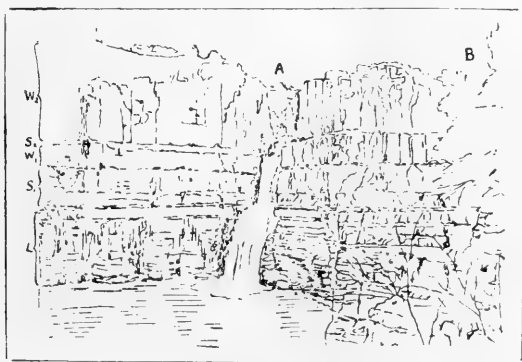
NOTES AND COMMENTS.

PHOTOGRAPHY AND GEOLOGY.

The second issue of British Geological Photographs, published by the British Association Committee, has been sent out by the Secretary, Prof. W. W. Watts. It includes 18 half plates, four quarter plates, and four whole plates, and each photograph is accompanied by detailed particulars. In this series it is pleasing to find a good proportion of north country views, from negatives made by Mr. Godfrey Bingley and Prof. E. J. Garwood. There are views of important sections in Teesdale, Yorkshire, Lancashire, Nottinghamshire, and Westmorland in the series. Almost as valuable as the photographs themselves are the excellent descriptions (sometimes accompanied by explanatory diagrams). One of these (by Prof. Garwood) is given below, together with one of the sketches.

HIGH FORCE, TEESDALE.

This is a classical waterfall, described by Sedgwick in 1823, Wm. Hutton in 1831, and Phillips, 1836. The fall is 70 feet high, over the Whin Sill, which is here intrusive in the Lower Yoredale Beds. The photograph shows the chief fall (A) near the right bank of the Tees. It is working along a joint in the hard Whin which forms the protective cap to the fall; when in flood surplus water also pours through a second joint near the left bank (B). The undercutting of the limestone is shown by the caves and the hanging icicles; the gorge below bears



The Whin Sill, at the High Force.

testimony to the recession of the falls. The section, as will be seen by the key figure, is as follows :—

W2.	Whin Sill	...	...	...	...	...	...	30 ft.
S2.	Shale, thinning out	...	...	...	...	...	...	2 ,,
W1.	Whin	...	...	...	...	...	...	9 ,,
S1.	Shale, altered, with superinduced prismatic jointing...							15 ,,
L.	Hard Limestone, with pyrites	...	...	...	...	...	...	8 ,,
	Hard, fossiliferous, crinoidal limestone	...	...	...	...	...	...	20 ,,
	Coralline limestone...	...	...	...	...	...	...	6 ,,

The limestone is altered and saccharoidal to a distance of 35 feet below the base of the whin; the latter is of the normal type described by Teall. See Sedgwick, Trans. Camb. Phil. Soc., 1823; W. Hutton, Trans. Nat. Hist. Soc. North Durham, 1832, p. 6; Phillips, 'Illustrations of the Geology of Yorkshire,' 1836, Pt. 2, pl. xxiii.; Phillips, 'Yorkshire Rivers,' etc., 1885, p. 46, pl. 8; Teall, Quart. Jour. Geol. Soc., Vol. xl., 1884, p. 640.

ROOTS OF *MEDULLOSA ANGLICA*.

Mr. E. A. Newell Arber has contributed an important paper to the March 'Annals of Botany,' in which the structure of a specimen of *Medullosa anglica*, probably from the Lower Coal Measures at Stalybridge, is figured and described. The specimen is in the Binney collection in the Woodwardian Museum, Cambridge. His examination has resulted in a more complete knowledge of the thin-walled tissues which lie between the xylem and the periderm. The most noteworthy points are: the presence of a thin zone of phelloderm, the structure of the phloem, and the discovery of lateral sieve-plates on the phloem-elements of both the stem and roots. The first British specimens of *Medullosa* (a genus of Palæozoic plants belonging to the Cycadofilices) were described by Dr. Scott in 1899.

A COMMON BUZZARD'S NEST.

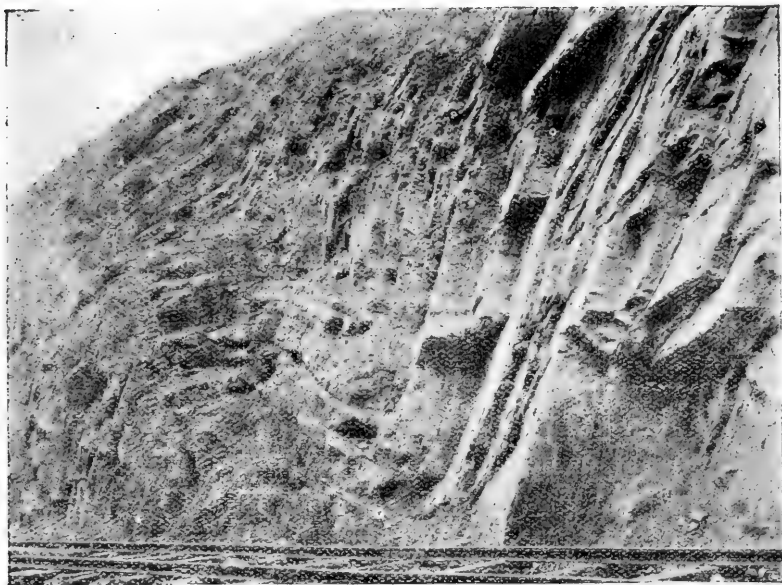
In the 'Memoirs and Proceedings of the Manchester Literary and Philosophical Society,' issued on 30th July, Mr. R. W. Ellison has an interesting note on a nest of the Common Buzzard in the Lake District. Notwithstanding the increasing persecution of gamekeepers and collectors, and the removal of large tracts of forest, the bird still exists in the Lake District, and Mr. Ellison has been able to make interesting notes on the habits of the birds. The accompanying photograph (Plate IX.) shows a typical Buzzard's nest, the block having been kindly lent by the Manchester Society.



Common Buzzard's Nest.

DERBYSHIRE LIMESTONES.

Mr. H. H. Arnold-Bemrose is continuing his excellent work on the sections exposed during the construction of the Ashbourne and Buxton branch of the London and North Western Railway. Records of this description, made whilst the cuttings are fresh, are of the greatest possible value. One noticeable feature in



Anticline and Syncline in Mountain Limestone; Alsop-en-le-Dale Cutting.

connection with these cuttings is the numerous folds into which the massive beds of Mountain Limestone have been thrown on the western side of the southern extremity of the Pennine Chain.

The results of Mr. Arnold-Bemrose's researches appear in the 'Geological Society's Quarterly Journal' for August, and we are indebted to the author and the Society for the use of the illustration.

MEETING OF THE BRITISH ASSOCIATION AT SOUTHPORT.

The Southport Corporation and the Local Committee are working hard to secure a successful meeting of the British Association beginning on Wednesday, 9th September. Under the editorship of Dr. G. W. Chester and Messrs. G. E. Johnson and F. H. Cheetham the scientific portion of the 'Handbook'

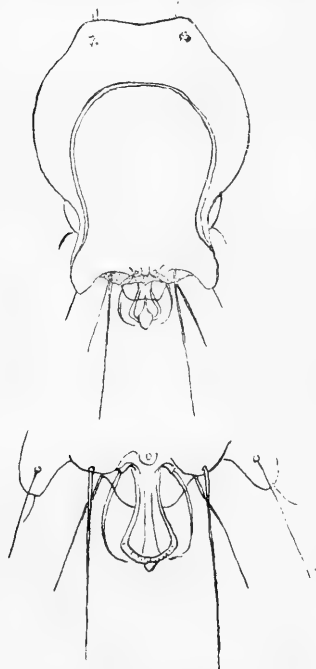
promises to be exceptionally interesting. Excursions in the vicinity will be numerous, so that those who are not so fond of garden parties, etc., will be able to occupy their time profitably. The Friday evening discourse will be delivered by Dr. R. Munro on 'Man as Artist and Sportsman in the Palæolithic Period,' and on Monday evening Dr. A. W. Rowe will discourse on 'The Old Chalk Sea, and Some of its Teachings.'

LINCOLNSHIRE FRESHWATER MITES.

C. F. GEORGE, M.R.C.S.,

Kirton-in-Lindsey, Lincolnshire.

Arrhenurus compactus Piersig. This uncommon water



Arrhenurus compactus Piersig.

Upper figure, Dorsal surface of Mite.

Lower figure, Ventral surface of tail,
more highly magnified.

mite very much resembles at first sight, *A. ornatus*. It was first described by Professor Piersig in 1894 (see Zool. Anz., V. 17, p. 117). Its colour is bluish-green, and the back humps are considerably separated from each other. The obvious distinguishing mark between this mite and *A. ornatus* is the structure of the petiole, which does not possess the sharp-pointed, lateral angles seen in the petiole of *ornatus*, and is in consequence more circular or club-shaped; the central tooth, or bag-like formation, is very prominent. These parts are well shown in Mr. Soar's figure, but are best seen when the creature itself is examined under the microscope, either alive or in preservative solution. Mr. Soar's measurements are:—Length, 0·96 mm.; breadth, 0·72 mm.; length of petiole, 0·15 mm. I have not heard of its being

recorded by any other observer in Great Britain.

PARTRIDGE MOTHERHOOD.

REV. J. CONWAY WALTER,

Horncastle.

IN a meadow adjoining Roughton Hall, near Horncastle, Lincolnshire, a Partridge this season made her nest in a slight depression of the surface. The meadow was presently mown, one of the mowers passing his scythe over without injuring her, and unaware of her presence, the depression still having grass enough to hide the nest. The field was afterwards 'fedded,' i.e., the hay was tossed about by a machine, which again passed over the bird, leaving her still unscathed and unmoved. Next the field was horse-raked, the rake passing over the nest with the same result. After this one of the haymakers accidentally nearly put his foot into the nest. This drove her off. The squire happened to be near and saw her fly away. He immediately went to the spot and found the nest, with the unusual number of 19 eggs. He removed all the hay some distance away to prevent her being again disturbed. He then watched, and within a quarter of an hour he saw her quietly return to the nest. About ten days afterwards she brought off 17 young out of the 19 eggs, two addled eggs remaining in the nest. Of course as the hatching time draws near, a bird, feeling the young lives beneath her, will sit very close; but surely this persistence in sitting, some ten days before hatching, and after no less than four trying ordeals, was a remarkable instance of fidelity to maternal instinct.

[The late E. T. Booth in his 'Rough Notes on Shooting' mentions an instance of a Ptarmigan sitting so close as to allow a luncheon party to partake of a meal within arm's length, and the bird only rose off its nest when a strap, being adjusted to a pony's harness, fell on its back.—EDS.]

FLOWERING PLANTS.

Plants near Caistor, Lincolnshire.—Among the 180 plants noted at the Caistor and Pelham Woods meeting of the Lincolnshire Naturalists' Union, on 28th August 1902, were the following:—*Papaver hybridum*, *Sagina procumbens*, *Geranium pyrenaicum* (Nettleton), *Filago spathulata*, *Artemisia vulgaris* (and at Barnetby), *Cnicus setosus*, *Origanum vulgare*, *Siegingia decumbens*, *Asplenium ruta-muraria*, and *Chara hispida*, *Geranium pratense* (Croxby churchyard).—E. ADRIAN WOODRUFFE PEACOCK, Cadney, Brigg.

RAVEN'S NEST ON LOUTH STEEPLE, ETC., 1693.

C. S. CARTER, M.C.S.,
Louth, Lincolnshire.

WHEN arranging various papers in the portfolio belonging to the Louth Antiquarian and Naturalists' Society, I found a curious note, and still more curious and interesting question and answer about a Raven's nest on Louth Steeple, and the Sutton Whale, in 'The Athenian Mercury,' Saturday, 1st April 1693. The following is a copy of it:—

'QUESTION 3. *There's a Raven has built a Nest in the North-West Pinnacle of Louth Church, in Lincolnshire (which church is 57 foot higher than Bow), the like has not been remember'd of 60 years, and above: Some People look upon it as Ominous, Your Thoughts are desir'd on the Matter?*

'ANSWER. The Business is a great way off, and therefore as the Old Woman said, it mayn't be *true*. But true or false, 'tis scarce worth the while to go so far for satisfaction, since be it Raven or Owl, or what it will, 'tis all one, and signifies no more, We believe, than that the *Raven* was willing to choose the best place she cou'd find for a *Prospect* for herself and her Young Ones. As for anything Ominous in't, We think it's only fit to be laughed at with the Old Auguries, for it can signifie nothing that we know of either *Naturally*, or by *Institution*; and, indeed how shou'd a *Bird* know more than a *Man*, and how foretell others *Fates*, that does not know its *own*? whether it shall be *shot* or *starv'd* or what end 'twill come to. As *Messulam* in *Josephus* Wittily said, when he took his *Bow* and *Arrows*, and kill'd the *Bird* out of which the *Soothsayers* were going to fetch Miracles. By the way poor *Lincolnshire* is very unlucky of late, for this it seems is the second direful Omen that Wise Mr. *Mob* has discover'd in't within these few weeks, the *Sutton Whale* being full as famous as the *Louth Steeple-Raven*; tho' We confess, had this Raven, like a *Halycon*, Swum down the River, and built its *Nest* in the Sea, and this *Gentle Whale* flown o'er the *Mountains tops*—Topt the *Woulds*, and been Shipwrackt on the *Northwest pinnacle of Louth Church*, there had been then Something in the business if not very *ominous*, yet very *wonderful*, and wou'd have well deserv'd the notice of the *Chronicle* as well as *Athenian Mercury*.'

NOTES ON YORKSHIRE BRYOPHYTES.

I. *PETALOPHYLLUM RALFSII*.

F. CAVERS, B.Sc.,
Yorkshire College, Leeds.

IN a brief note which appeared in 'The Naturalist' in July 1901 Mr. W. Ingham recorded the discovery in Yorkshire of the exceedingly rare liverwort *Petalophyllum Ralfsii* (Wils.) Gottsche, which he found growing on Coatham Marshes, in company with a species of *Pallavicinia*. The latter is itself a rare and interesting liverwort, and will form the subject of a later paper, but whereas the *Pallavicinia* grows in abundance and forms crowded patches, *Petalophyllum* occurs very sparingly, an isolated plant being found here and there on carefully teasing out the rosettes of *Pallavicinia*. Last year Mr. Ingham was kind enough to send me numerous dried specimens of the *Pallavicinia*, and later supplemented this material by sending a large supply of living plants. A few specimens of *Petalophyllum* were present in this Coatham gathering, and a few more were kindly sent by Mr. W. H. Pearson, who collected this plant in Anglesey, again in company with a species of *Pallavicinia* (*P. hibernica* var. *Wilsoniana*).

Petalophyllum Ralfsii is probably the rarest of the known species of Hepaticæ, having up to the present time been found only in about six localities and invariably in very small quantities. It was first collected in Anglesey (1830) and near Penzance (1842) by John Ralfs, and was first described and figured by Wilson ('English Botany,' Pl. 2750, Fig. 16; E.B. Suppl., Pl. 2874). It was afterwards recorded from two localities in Ireland: one in Co. Dublin, the other in Co. Kerry. *P. Ralfsii* has recently been collected by Massalongo* in Italy, apparently the only hitherto recorded instance of its occurrence outside of the British Islands. In all cases it grows in damp sandy ground near the sea. In 1886 Trabut† described as a new species of *Fossombronia* (*F. corbulæformis*) an Algerian plant which appears to be in reality a *Petalophyllum*, allied to if not identical with *P. Ralfsii*. Two other species have been described from Australia and New Zealand.

* Sulla scoperta in Italia del *Petalophyllum Ralfsii* Gott., Bull. della Soc. bot. ital., 1902, p. 37.

† Revue bryologique, 1887, p. 12.

The shoot of *P. Ralfsii*, which is about 1 cm. in length, is roughly triangular in outline, having a basal cylindrical stalk-like portion, 3—5 mm. long, and spreading out above into a fan-like expansion, sometimes forked once in front (Fig. 1). The broad, flattened portion bears on its upper surface numerous thin lamellæ or leaves, which are arranged in two lateral series and run obliquely outwards and forwards, each starting from near the middle line and almost reaching the margin of the plant. The cylindrical basal part of the stem grows obliquely

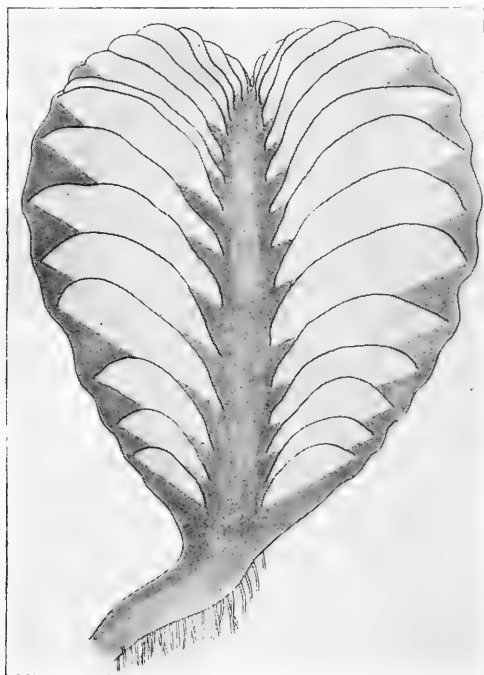


Fig. 1.—Plant as seen from above. $\times 8$.

upwards through the sand in which it is embedded, whilst the flattened leaf-bearing upper portion spreads out horizontally over the surface. The basal portion is nearly circular in cross-section (Fig 2, I.) and consists of practically uniform tissue, the superficial cells bearing rhizoids, which spring from almost the whole of the stem-surface. In longitudinal sections, the central cells are seen to be longer and

rather narrower than the outer ones, and their walls show numerous oval or slit-like pits. There is, however, no definite conducting strand, and on placing plants with the lower end dipping into coloured liquids, it was found that the staining solution passed with uniform rapidity through the central and peripheral tissues.

An interesting feature observed in the Coatham plants is the occurrence of abundant branching fungal hyphæ in the stem.

The fungus was found to extend throughout the whole of the lower portion of the stem, but in the upper expanded portion it is confined to a ventral zone immediately within the superficial layer of cells (Fig. 2). The hyphæ were frequently seen to traverse the rhizoids and penetrate the inner cells, in which they become branched and coiled in an intricate manner, often entirely filling the cell-cavity. Here and there the hyphæ bear swellings, but the vesicles are not nearly so large as in the fungal zone or mycorrhiza of the Marchantiaceæ, e.g., *Fegutella*, *Preissia*.

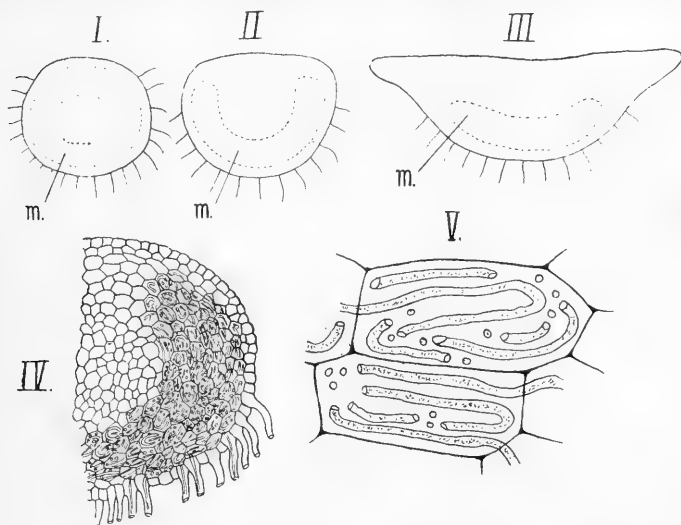


Fig. 2.—I.-III. Successive transverse sections of the stem, $\times 20$; m, mycorrhizal zone. IV. Part of I., $\times 50$, showing fungal hyphæ traversing the rhizoids and ramifying in cells of mycorrhizal zone. V. Two cells containing hyphæ, $\times 350$.

In passing towards the upper or leaf-bearing region, the stem becomes flattened above and below, with an oval cross-section, the rhizoids at the same time becoming confined to the lower surface (Fig. 2, II., III.). Further upwards, the lateral wings appear as horizontal outgrowths, level with the flattened upper surface of the stem, of which they are simply lateral expansions. These wings consist for the greater part of three or four layers of cells, thinning out at the margin to a single layer. The wings increase in breadth from behind forwards and then diminish again towards the anterior end of the shoot, where there is a shallow notch occupied by the apical growing-point. In the apical region, the lower surface of the stem bears numerous small scales, arranged in two longitudinal rows; each

scale consists of a triangular plate or ribbon of cells, the apex of the triangle bearing a few long mucilage hairs. Further back, these scales become withered, and none are to be found on the older parts of the stem, their function being simply that of keeping the growing-point moist.

The leaves stand on the flattened wings of the stem (Fig. 3), but sometimes encroach upon the thick median portion or 'midrib' or may even extend across the middle line, in which case the leaves of the opposite sides may join and form a continuous lamella reaching across the whole plant. Each leaf slopes forwards so as to overlap the next leaf in front, and occasionally we find two or more of the leaves on the same side of the plant becoming joined by a membranous outgrowth from the stem-surface. The leaf consists of a single layer of cells, forming a ribbon which is often about 20 cells in maximum

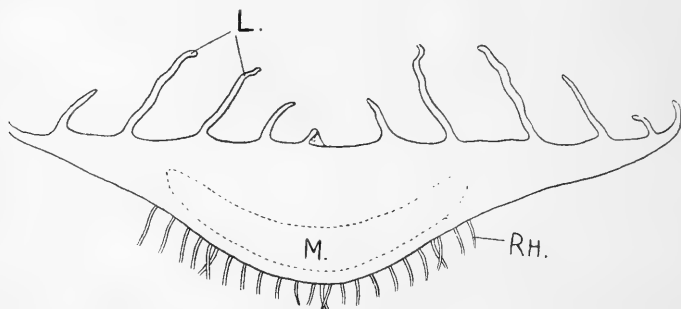


Fig. 3.—Transverse section through the middle of the leaf-bearing region of the plant. L., leaves; M., mycorrhiza; Rh., rhizoids, $\times 20$.

breadth and gradually narrows at either end; the free margin is usually even, but sometimes lobed, irregularly toothed, or thrown into folds. The cells of the leaf are usually hexagonal in surface view, and contain numerous large chlorophyll-grains; chlorophyll is also present, but sparingly and in smaller grains, in the superficial cells of the stem. It is obvious that the development of these leafy appendages on the upper surface of the stem serves not only to increase the area of green assimilating tissue but also to form numerous cavities in which water can be retained.

The growth of the shoot takes place by means of a single apical cell, which has the form of a three-sided pyramid; in transverse sections through the growing-point this cell is seen as an isosceles triangle, the shorter side being nearest to and parallel with the ventral surface of the stem (Fig. 4, II.). From

this cell three sets of segments are cut off, the ventral segments giving rise to the axial portion of the stem, with the rhizoids and scales, whilst the lateral segments give rise to the leaves and to the lateral wing on which the leaves are carried, as well as to the sexual organs. Each lateral segment shows at an early stage a division into an upper portion which gives rise to a leaf and a lower portion which contributes to the formation of the expanded wing of the stem. Each ventral scale arises as a club-shaped mucilage-hair, borne on a stalk-cell which soon divides actively and forms a narrow plate of cells; the original

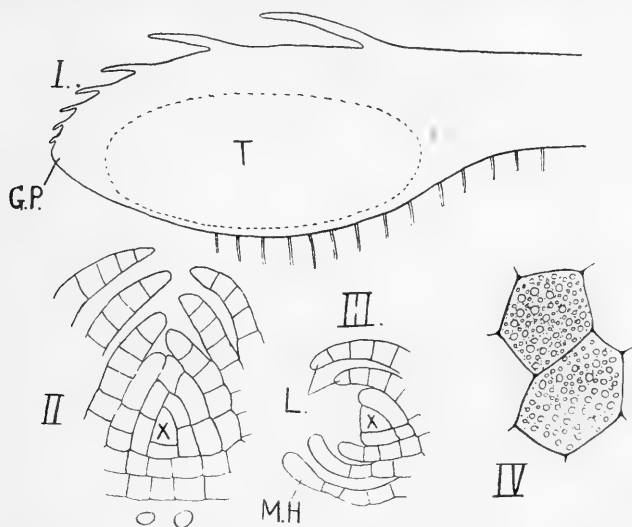


Fig. 4.—I. Longitudinal section through apex of stem, showing the tuberos swelling (T.) behind and below the growing-point (G.P.). II. Transverse section of growing-point, showing the apical cell (X.). On either side are the young leaves (L.); below are two mucilage-hairs in cross-section. III. Part of a longitudinal section through the growing-point. L., leaves; M.H., mucilage-hairs. IV. Two cells in the tuber, showing densely granular contents. I., $\times 20$; II., III., $\times 150$; IV., $\times 350$.

mucilage-hair is carried out on the apex of this plate, the marginal cells of which also grow out to form similar hairs (Fig. 4, II., III., M.H.).

Lindberg,* in a brief note on *Petalophyllum*, suggested that the lamellæ, together with the lateral expansion bearing them, arise by the fusion of overlapping leaves, and that only the thick median portion of the shoot is to be regarded as the stem, but careful examination of the plants by means of sections, especially

* Manipulus Muscorum secundus, 1874, p. 390.

of the apical growing-point, entirely bears out Leitgeb's view* that the lamellæ alone represent the leaves, and that the wing which carries them is simply a lateral expansion of the stem.

The excellent general account given by Leitgeb in his 'Untersuchungen' is based chiefly on his investigation of *P. Preissii*, though he also examined a few plants of *P. Ralfsii*. Leitgeb found that in *P. Preissii* the apical cell was of the wedge-shaped or 'two-sided' type, only two lateral series of segments being cut off, as in *Fossombronia*, whereas in *P. Ralfsii* the apical cell is tetrahedral, as in the majority of the leafy Jungermanniales. He states that in other respects the two species closely agree, but in the specimens of *P. Ralfsii* examined by me the posterior portion of the shoot is quite cylindrical and shows no trace of the marked dorsal groove described and figured by Leitgeb in *P. Preissii*.

An interesting feature in the biology of *Petalophyllum* is the formation of tubers containing reserve food-materials. Leitgeb describes and figures plants of *P. Preissii* in which the anterior end of the shoot is prolonged into a cylindrical tuberous outgrowth, though he gives no details as to the contents of these protuberances. In *P. Ralfsii* I have not observed any outgrowths of this kind, but have found tubers of another type, closely similar to those described and figured by Campbell† in *Geothallus tuberosus*, an interesting Californian species which also shows a striking resemblance to *Petalophyllum* in general structure and in habitat. Lindberg states that during the summer months the plants of *P. Ralfsii* become partially or completely buried in the sand, but Mr. Ingham, who has visited the habitat of this species on Coatham Marshes at frequent intervals throughout the summer, informs me that, so far as his experience goes, the sandy soil in which the plant grows, in company with *Pallavicinia Flotowiana*, does not at any time of the year become dried up but is invariably moist and spongy, and that the plants do not become buried in the sand but are sheltered by short grass and other vegetation. The tubers referred to are found in plants collected in summer; on sectioning a plant taken in May or June, the tissue of the stem, immediately behind the growing-point, is found to have become thick and fleshy, forming an ovoid tuber which projects from the ventral surface and bears numerous rhizoids. In sections

* Untersuchungen über die Lebermoose, Heft 3, p. 127.

† 'The Development of *Geothallus tuberosus*,' Annals of Botany, Vol. 10, 1896, p. 489.

(Fig. 4, I., IV.) the cells in this region are seen to be densely filled with granular contents, giving the reactions of oil and of proteid matter, but not of starch. The outer layers of the stem form a sheath or envelope to the tuber, two or three cells in thickness; these cells are flattened and are usually almost empty, but sometimes contain fungal hyphæ, which may pass inwards and ramify through the densely granular cells of the tuber. Later in the year, the more delicate parts (leaves, etc.) become withered and discoloured and ultimately disappear, but the tuber remains intact and afterwards grows out to form a new plant, giving rise to a cylindrical process which passes over into the normal leafy shoot.

The sexual organs and the sporogonium of *Petalophyllum* agree closely with those of *Fossombronia*. In the male plant the antheridia are scattered along the upper surface of the midrib; in the female plant the archegonia occur in groups on the lateral wings of the stem, standing between the leaves. The antheridium is nearly spherical and is borne on a short stalk; it is covered by a scale which may be either hood-like, growing forwards over the antheridium, or tubular, growing up around the antheridium as a sheath. Frequently, as noted by Leitgeb, the sheaths or scales of adjacent antheridia grow up together so as to form a network of chambers, each containing a single antheridium. Each female plant bears several groups of archegonia, standing one behind another and on both sides of the midrib. According to Leitgeb each group may contain as many as twelve archegonia, but I have never found more than eight, whilst most of the groups examined contain only five or six of these organs. Each group is at first surrounded by a number of narrow scales or leaf-like outgrowths from the stem-surface. Should one or more of the archegonia be fertilised the perianth begins to grow up as a tubular sheath which surrounds the whole group of archegonia and lies immediately within the ring of scales. As the perianth grows upwards some of the scales (involucral leaves, female bracts) are carried up on its outer surface, so that the mature perianth bears externally a number of leaf-like appendages. Between the archegonia there grow out numerous club-shaped hairs which secrete mucilage.

The large spherical capsule is borne on a well-developed stalk which ends below in a conical swelling or foot; the margins of the foot grow upwards round the base of the seta, so as to be heart-shaped in longitudinal section, as in *Pellia*. When the capsule is mature the seta becomes elongated and

may reach a length of over 3 cm. The capsule-wall consists of two layers of cells, those of the outer layer being flattened and devoid of fibrous thickenings, whilst the large cells of the inner layer bear incomplete rings or U-shaped fibres, the thickenings being found on the inner and lateral walls and failing on the outer walls of the cells. When the capsule has been carried up by the elongation of the seta the upper half of its wall breaks up into irregular fragments, which become detached, exposing the mass of spores and elaters and leaving the lower half of the wall as a cup with toothed margins. Each of the dark-brown spores bears on its outer surface a series of ridges which form a network; the elaters are long and tapering at both ends, and show two or sometimes three spiral fibres.

So far as the structure of the sporogonium is concerned *Petalophyllum* closely resembles *Fossombronia*, but until Campbell's discovery of the Californian plant already referred to, *Geothallus tuberosus*, *Petalophyllum* was regarded as an isolated genus, by reason of the peculiar organisation of the gametophyte. Between *Petalophyllum Ralfsii* and *Geothallus* there is a remarkably close agreement, so far as the gametophyte is concerned. In both cases the shoot consists of a basal cylindrical portion, spreading out anteriorly to form a fan-shaped expansion which carries on either side a series of parallel lamellæ (leaves). Moreover, *Geothallus* is distinguished by the formation of tubers exactly resembling those here described for *P. Ralfsii*. The two genera differ widely, however, in the organisation of the sporogonium. In *Petalophyllum* the seta grows out to a considerable length, the cells forming the capsule-wall bear well-developed thickening-fibres, and the spores are accompanied by long spirally-thickened elaters. In *Geothallus* the sporogonium is much simpler and resembles that of *Sphaerocarpus*; the seta is very short and narrow, the capsule-wall is devoid of fibrous thickenings, and the elaters are represented only by slightly-elongated sterile cells scattered amongst the spores. It is, of course, an open question as to whether much stress should be laid upon the characters of the gametophyte in considering the affinities of these Anacrogynous forms, for not only do tubers occur in several genera of Hepaticæ (e.g., *Riccia*, *Fossombronia*, *Anthoceros*) besides *Petalophyllum* and *Geothallus*, their production being characteristic of xerophytic or sand-inhabiting forms, but Campbell* has observed specimens of *Sphaerocarpus terrestris* which instead of being strictly thalloid, as is usual in this genus, had developed leaf-like appendages somewhat similar to those of *Geothallus* or *Petalophyllum*.

* Notes on *Sphaerocarpus*, Erythea, May 1896.

RHÆTIC BEDS AT LINCOLN.

F. M. BURTON, F.L.S., F.G.S.,

Gainsborough.

THAT the Rhætic beds would be encountered in the new boring for water at Lincoln, which is intended to reach the Bunter, was a foregone conclusion.

On the 7th August I had the pleasure of examining, with Mr. J. H. Teague, the engineer in charge, the cores which had been brought up in executing the work, and the following is a short summary of the Rhætic portion.

Unfortunately only those cores are preserved which appeared to show decided changes in character, and the intervening beds can only be conjectured, so that a detailed description of the beds is impossible.

After passing through 640 ft. of the Lower Lias, including 20 ft. of the *planorbis* zone, with its characteristic fossil, at the base (in itself a matter of considerable interest, as the members of this zone are very little in evidence in this part of the county), a smooth, pale-blue, laminated stone, without fossils, was met with, in all probability of Rhætic formation; but whether it can be classed as the highest of the Rhætic beds in this area, or whether it forms a narrow band at the base of the Lower Lias, the beds succeeding it must have represented the sandstones and shales of the Upper Rhætic strata, for, 14 ft. below it—at a depth of 654 ft.—the next core, preserved, is a narrow block, barely 2 in. thick, of the usual ‘black shales’ of the Rhætic beds, crowded with characteristic fossils, and freely speckled throughout with large mica-scales.

These black shales, with the other Rhætic deposits below them, carried the bore down 22 ft. further, to the depth of 676 ft., when, as the next preserved core showed, the grey beds, which are now classed by some geologists as Rhætic, appeared, continuing down, for 23 ft. further, to the red marls of the Keuper, which were reached at a total depth of 699 ft.

No trace of the bone beds, nor of the pyrites, so abundant in the Lea cutting, could be seen.

It is much to be regretted that so little has been preserved in sinking this shaft, but, from the evidence we have, we are justified in putting the total thickness of the Rhætic beds in the neighbourhood of Lincoln (including the grey beds) as about 59 ft.

	ft.	Depth of bore. ft.
Lower Lias	—	640
Upper Rhoetic beds	14	654
Black Shales, etc.	22	676
Grey beds	23	699
Total thickness		—
Keuper	—	—

BIRDS OF THE GOATHLAND DISTRICT.*

T. STEPHENSON,

Whitby.

Spotted Crake. *Porzana porzana*. Has been shot in Newton Dale.

Common Curlew. *Numenius arquatus*. Breeds regularly on Goathland Moor.

Dipper. *Cinclus aquaticus*. Breeds in the district.

Mallard Duck. *Anas boschas*. Breeds occasionally in Fen Bogs.

Teal Duck. *Nettion crecca*. A few years ago bred at Randy Mere, Goathland.

Peregrine Falcon. *Falco peregrinus*. The late Canon Atkinson said it used to breed on Killing-Nab Scar, Goathland. One trapped at Goathland a few years ago.

Common Heron. *Ardea cinerea*. Has been seen in the neighbourhood during the breeding season.

Kingfisher. *Alcedo ispida*. Breeds in the district.

Merlin. *Falco Æsalon*. Said to breed annually. Female taken at Goathland in 1895.

Nightjar. *Caprimulgus europæus*. Breeds in the district.

Ring Ouzel. *Merula torquata*. Breeds on Goathland Moor.

Short-eared Owl. *Asio accipitrinus*. Said to breed in the neighbourhood.

Golden Plover. *Charadrius pluvialis*. Breeds in the district.

Raven. *Corvus corax*. Seen on Stape Moor ten years ago.

Common Redshank. *Totanus calidris*. Has been shot at Goathland.

Redstart. *Ruticilla phœnicurus*. Sometimes seen in the district.

Reed-Warbler. *Acrocephalus streperus*. Has been known to nest in Fen Bogs.

Woodcock. *Scolopax rusticola*. Has bred in the district this season.

Green Woodpecker. *Gecinus viridis*. Breeds in the district.

* Read at Goathland, 27th June 1903.

IMPROVEMENTS OF GROUSE MOORS.

J. A. HARVIE-BROWN, F.R.S.E., F.Z.S.,

Larbert.

THE recently-issued pamphlet on 'The Improvement of Grouse Moors,'* calls for some remark, as the views given differ somewhat from those held by some naturalists who live on the moors. The author also tells us much, I think, certainly not known before!

One thing I utterly disapprove of, viz., the introduction of 'all-Yorkshire stock' to a place like Shetland, where 300 brace were put down upon the recommendation of an English specialist for, I am told, a fee of £50 or guineas. *All* were Yorkshire birds, brought from the finest treated heather in England to the rank old unprepared heather-ground of Shetland, and put down there en masse. I do not know positively who the specialist was; but the writer of the pamphlet would do well if he would record the results of that introduction! It would distinctly have been wiser to have gradually introduced birds from Caithness, or the West of Scotland, with possibly a few Yorkshire cocks besides, than to have put down a 'pack' of 300 brace of Yorkshire 'high-flyers.' Where are those 300 brace of Yorkshire grouse now which were introduced a year or two ago?

At the present day *miles* of old heather are burned—and it is *not* 'a forgotten thing of a barbarous past,' but a 'modern improvement' of 'modern specialists.' It makes deer-grass for two or three years, and for ever destroys all future growth of heather, as it is burned down to the roots, and the *roots* no longer give off the young shoots which the writer of the pamphlet erroneously calls 'seedlings!' (p. 13). And sheep are called the 'greatest enemies the grouse have to contend with.'

I could write much more as a Scotsman writing for Scotland's interests, against crude ideas of a few year's experience.

Burning to the root makes grasses grow first, on such ground, which are sweet and succulent for deer for a very few years. Then, up springs the first *seedlings* of the bracken, which in turn will seed and sow *up the hills*, until there is no 'deer-grass' left. The chain of destruction is as follows:—

(1) *Burned old heather root and branch*—not left with root,

* Rural Studies Series, No. 3, by Rev. E. Adrian Woodruffe Peacock, L.Th., F.L.S., F.G.S., M.C.S., Vicar of Cadney, Soil, Grass, and Game Specialist, 16 pp., Louth, 1903.

and stems only scorched, *for grouse*—but burned out by *root and branch*, for *deer*: because deer do not like to tread on heather stumps; and because grass will not grow where stumps are left, but *young sweet* heather recurs.

(2) *Deer-grass* succeeds and yields fine deer-food for a few years. 'We don't want the grouse,' says the deer-stalker of the present day, who pays £35 for a stag.

(3) The grass gets *rank* and *white*, and may again be burned; but burning will not destroy or affect the bracken-roots or the bracken seed, which is the sure resultant in many hillsides of the killing out of heather. If rank and white, deer won't look at it.

(4) *The bracken seed* of 100 years, on any old crofting-ground or 'lazy-bed,' sprouts and grows, seeds, and sows, up to the furthest skyline, in many places well known to me. Where, formerly, 450 brace of grouse were shot, *now*, not four brace of birds can be met with in a day's walk in June or July! I can instance some of these if need be! In ten years or fifteen—I venture to prophesy, from what I know of certain places—there will be no heather; no deer-grass fit for deer; but bracken and rabbits only.

(5) The author of the pamphlet blames sheep! Highland cattle were once in evidence. Then, black-faced *native* sheep—'moor-sheep' *he* calls them! Then came Cheviots—'pale-faced marsh sheep' let *me* call *them*, for want of a better name. Now, both Cheviot and black-faced are mingled. But sheep have given place to *deer*, and one almost continuous vast '*fashionable*' deer-forest extends from Cape Wrath to the northern borders of Argyll.

Yet long ago—1835-8—when Sir Francis Mackenzie of Gairloch lived (and *knew* his property) he had plenty of both *deer and grouse*—as I can prove from his own letters written there, in the heyday of his wise management. *Now*, A.D. 1903—'Look over the march fence'—desolation and temporary deer-grass!! Wait a little, and I venture to prophesy from facts I have already ascertained, there will *soon* be bracken and rabbits, rabbits and bracken. And perhaps by that time some new fashion may come in, when rabbits will be classed as the highest value of wild animals for sport.

Far from there being a continuance of a '*barbarous past*' in the conduction of our Highland properties, there is a crudessence of ignorance by men not born and bred there, and who are unaccustomed to the management of the land. To those who

have lived (and learned) to manage Highland properties, and who still know how to do so, the folly and suicidal burning of vast stretches of old heather is a sight sickening and heart-breaking, done to please the fashion which makes a stag worth the fancy price of £30. Tom, Dick, and Harry may—nay 'must'—shoot stags, just as nine-tenths of holiday anglers needs must go and kill *tons* (literally) of 'sea-trout tidal kelts' in April, May, and even June, before the true 'clean run'—i.e., *clean run from the real salt water*—come with the spring-tides and floods of July.*

What has become of the succulent so-called 'reindeer-moss,' good early spring deer-food, and what has become of the heather which formed part of their winter-feeding? Burned out, sir—burned out. Suicidal policy! Bracken and rabbits, rabbits and bracken—say, twenty years' hence, when I will likely not be alive to see it—'from Cape Wrath to Finisterre' (or at least to the southernmost stretch of the N.W. Highlands).



SOME HOLDERNESS MYXOMYCETES.

T. PETCH, B.Sc., B.A.,

Hedon.

DURING the Christmas vacation of 1902 the casual discovery of a Myxomycete on the Humber lands led me, in the absence of other occupation, to investigate a few likely places in the neighbourhood of Hedon in the hope of finding more. Hedon is situated at the edge of the Humber alluvial flats which, without the protection of the banks, would be inundated by nearly every tide; and as is usual in such districts, modern agriculture allows only a few trees in the hedgerows or an occasional spinny in some odd corner, planted, in this case, within the last hundred years. Want of time prevented any investigation of the more wooded morainic hills of Paull. All the following species were collected within a mile of Hedon, and the list merely indicates what may be expected in the immediate neighbourhood of an average village during the last week of the year.

* Yet 'The Field' (published in *London*)! and even our friend's (Mr. Marston's) 'Fishing Gazette' publish record-takes of tidal kelts from Ythan in the east, to the Hebride Isles, in April, May, June; and the syndicates and the hotels advertise 'early sea-trout' ('early Scottish sea-trout' if you *must* have it full) as inducements to *green* and Holiday anglers.

The first specimen was *Dictydiaethalium plumbeum* Rost., gathered on hawthorn branches in a dead fence near the Humber Bank on 24th December. On 26th December a 'stick-heap' within the borough, consisting of branches from the elms of the adjacent rookery and tree trunks from the adjoining fields yielded *Badhamia macrocarpa* Rost., *Physarum nutans* Pers., *Physarum compressum* Alb. & Schw., *Trichia varia* Pers., *Margarita metallica* Lister, all on elm; *Dictydiaethalium plumbeum* Rost., on hawthorn; *Perichæna depressa* Libert, on ash; *Didymium difforme* Duby, on nettles; and a decayed ash in a hedge gave *Comatriza obtusata* Preuss, and *Perichæna populina* Fries, in abundance.

On 29th December, a fallen willow, aslant a ditch, at Rose Hill, provided *Stemonitis fusca* Roth., *Comatriza obtusata* Preuss, *Cribraria aurantiaca* Schrad., *Protrichia flagellifera* Rost., *Margarita metallica* Lister, *Trichia varia* Pers. on a decaying fungus; and a group of old willows, surrounded by decaying branches, near Newton Garth, yielded *Comatriza obtusata* Preuss, *Physarum nutans* Pers., *Trichia varia* Pers., *Protrichia flagellifera* Rost. abundant, *Margarita metallica* Lister, *Arcyria punicea* Pers., *A. flava* Pers., *A. albida* Pers. on worked wood, and two other doubtful species.

On 1st January 1903, I found that the 'beëding,' or make-shift fence of dead thorns, often built to protect a recently-cut hedge, formed an admirable substitute for the heaps of leaves and twigs of more wooded districts. All contained the ever-present three which head the last list; whilst one, older than the others, gave in addition *Chondrioderma radiatum* Rost., two sporangia; *Dictydiaethalium plumbeum* Rost., on hawthorn; *Licea flexuosa* Pers., abundant on worked wood; *Enteridium olivaceum* Ehren., *Trichia fallax* Pers.; *Arcyria albida* Pers., on worked wood; *A. incarnata* Pers., on worked wood; *Margarita metallica* List., *Protrichia flagellifera* Rost.

Up to this date the weather had been very mild; *Myosotis palustris*, *Alliaria*, *Heracleum*, *Anthriscus sylvestris*, *Bellis*, *R. acris*, and *Geranium dissectum* were in flower on 27th Dec.; but now the delayed frost killed the immature Myxomycetes and made further search somewhat suicidal. On 3rd January, however, *Perichæna variabilis* Rost. and *Didymium difforme* were found in abundance on poplar and hawthorn leaves by the roadside in the town, apparently just developed. Some of the *Perichæna* had ripened on feathers.

The lists given, though involving much repetition, illustrate the ubiquity of several species and the evident concentration of species in suitable localities. The favourable patches in an unfavourable district are richer than equal areas in a district of which every part invites attention.

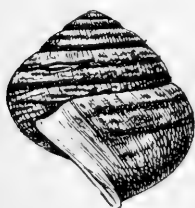
On a visit to Rose Hill, 11th April 1903, *Reticularia lyco-perdon* Bull. was observed on the willow noted above.

NOTE ON A TWO-BANDED SHELL OF *HELICIGONA* *ARBUSTORUM* FROM WENSLEYDALE.

H. WALLIS KEW,

London.

My friend Mr. F. W. Wilson, who has been spending a fortnight in Wensleydale, has returned with a shell of *Helicigona arbustorum* which has been pronounced by Mr. Taylor to be the most interesting specimen of this species as yet seen by him. It was found, on 5th May 1903, on the roadside near the stepping-stones at Aysgarth; and is represented in the accompanying figure, which has been drawn for me by Mr. J. Green. The shell differs materially from the type in one respect only: namely, in having, in addition to the band usually present, another band midway between the normal one and the suture. The two bands are nearly coextensive, and on a part of the



Helicigona arbustorum
v. *bifasciata*. Aysgarth.

body-whorl the additional one is as distinct, or nearly as distinct, as that in the normal position; in parts it is less sharply defined, but both are distinctly traceable side by side over the greater part of the spire, the additional band being lost only a little before the merging of the normal band in the dark colouring of the apex. In some Helicoid snails the presence or absence of a band, it must be admitted, is not of great importance; but in *Helicigona*

arbustorum the occurrence of an unexpected additional band is certainly of much interest. Of the thousands of specimens which have been seen by Mr. Taylor from various parts of these

islands, all hitherto have been single-banded or bandless;* and I am indebted to Mr. G. K. Gude for the opinion that similar conditions prevail in all the numerous varieties—and in the immediate allies—of *Helicigona arbustorum* in continental Europe. Beyond the section to which this species belongs, however, but still within the genus *Helicigona*—and the fact is of special interest in the present connection—there are many species with bands placed similarly to those of the Aysgarth shell; and having in addition still another band a little below the periphery. These shells have the supra-peripheral band of *Helicigona arbustorum* with one above and one below it; and this three-banded condition may be said to be typical of *Helicigona*, which never presents the five bands of *Helix*. It is perhaps desirable to give the two-banded form of *Helicigona arbustorum* a varietal name: this is the view of Mr. Gude; and as the opinion of one admitted by Pilsbry to the first rank of Helicologists is worthy of due respect, I have ventured to propose a name for our shell, in the hope that renewed search in the neighbourhood of Aysgarth and elsewhere in Wensleydale may result in the finding of further specimens.

Helicigona arbustorum v. *bifasciata* v.n. Resembling the type, but having two bands; one normally placed, the other midway between it and the suture. Aysgarth: 5th May 1903 (F. W. Wilson); in the collection of Mr. G. K. Gude.

SNAILS AND SPIDERS ON TOWERS.

H. WALLIS KEW,
London.

THE readers of 'The Naturalist' are doubtless grateful to the Rev. E. P. Blackburn for his interesting note (p. 265) of the finding of at least a dozen shells of *Hygromia hispida* of varying sizes at the top of the high tower of Bridlington Priory. It is perhaps reasonable to conclude that these shells, though dead, represented a temporary establishment of the snail in this

*The late Mr. Mansel-Pleydell in his 'Land and Freshwater Mollusca of Dorsetshire,' Proceedings of the Dorset Natural History and Antiquarian Field Club, VI. (1885), p. 109, notes under *H. arbustorum*: 'Houghton Wood (shell smaller, with three brown bands round the last whorl)'; and a similar entry appears, without further particulars, in the same author's 'Mollusca of Dorsetshire,' 1898, p. 12. It would be well to be assured that there is no possibility of error here, and to know the condition and position of the bands. My endeavours to trace the specimen, however, have not been successful.

remarkable situation; and one is naturally led to inquire as to the origin of the colony. In this connection we may recall that early in 1890 Mr. Heathcote saw a fine specimen of *Limnæa truncatula*—a water-snail—crawling on the top of the tower of St. James' Church, Preston, 90 or more feet from the ground. As regards land-shells, Captain Farrer has noted the occurrence of the beautiful little Helicoid snail *Vallonia pulchella* on the moss-grown roof of an old mill at Bassenthwaite; Mr. S. C. Cockerell has recorded the finding of *Balea perversa* and *Carychium minimum* high up under the clerestory windows of the Cathedral at Beauvais; and further the late Mr. E. L. Layard discovered among the collections of Wollaston a box containing a lot of fine adult *Helix muralis*, evidently collected by Wollaston, and labelled in his well-known handwriting: 'from the top of St. Peter's at Rome.' In some cases of this kind it is conceivable that molluscs spreading generation after generation by ordinary progression may ultimately reach the odd situations in which they occur; this, however, is obviously impossible in the case of the *Limnæa*; and though it is difficult to exclude the possibility of capricious action by man, it is probable, I think, that we see in most of the cases the result of accidental dispersal by winged creatures, presumably birds. Daws build in the tower at Preston, and it is suggested that one of them brought up the water-snail on a stick used for its nest; similarly it occurred both to Mr. Cockerell and Mr. Layard that the colonies to which they refer had probably been established by pigeons, which are supposed to have carried up the molluscs on their nesting materials. Captain Farrer, moreover, believed his *Vallonia* to be bird-carried, since he failed to find the creature on the ground surrounding the mill. We have a further reference to St. Peter's by Dr. McCook, who records the finding of a number of spiders of the genus *Epeira* [*Araneus*] in their orb-webs on the topmost railing of the dome. Here, however, we have not to rely on accidental transport, since the aeronautic habits of spiders, more especially the young, furnish them with an efficient means of dispersal. Taking up an exposed position facing the breeze, elevating the hind-body, and allowing silk to be carried from the spinnerets, they are soon afloat, and may be conveyed to great distances as well as to great heights. This is a subject which much interested our celebrated Lister, who tells us that he saw some sailing spiders at York in 1669 with their lines entangled on the pinnacles of the highest steeple of the Minster.

SHORE-COLLECTING NEAR SCARBOROUGH AND FILEY.

REV. W. C. HEY, M.A.,

West Ayton, near Scarborough.

It is a pity that almost all naturalists—even those who live by the shore—prefer to study the plants and animals of the land rather than the plants and animals of the sea. I admit there is more beauty, more variety, and more sentiment about spring flowers, than about the most elegant seaweed—though the briny scent of the fucus is to me quite as delightful as the fragrance of violets—but in some classes of *animals* the sea stands easily first. In fishes, molluscs, crustaceans, and zoo-phytes the freshwater is very far behind the sea.

No doubt a principal reason why people shirk marine studies is because the best results can only be obtained by *dredging*, and dredging is not only a very expensive amusement, but is also accompanied by a ‘queer sort of up-and-down motion,’ which has such extraordinary effects upon some individuals (even naturalists) that they would gladly give up the sea and all the things that therein are for one square yard of dry land.

However, a good deal may be done by shore-collecting, for we may secure the productions of *three* zones of life without leaving terra firma. We have *first* the plants and animals whose home is between ordinary tide marks; *secondly*, those which are uncovered only at spring-tides; and *thirdly*, those which are torn from deeper water in stormy weather, and deposited upon the beach when the waves subside. Scarborough is a fairly good place for the first and second class. Filey is an excellent locality for the third.

Beginning at the top of the first zone, the first mollusc we meet with is a tiny periwinkle *Littorina rudis* var. *saxatilis*—that is the ‘rock-loving’ periwinkle—well named, because its favourite dwelling-place is in the crevices of cliffs, often in places where it is only wetted with the spray of ordinary high tides. It is common in the south bay, and used to be still commoner round the Castle Hill before Scarborough’s crowning vandalism had taken form. A little further down, on the scars, we find two other periwinkles, *Littorina littorea*, the species commonly eaten, and *L. obtusata*, easily known by its perfectly flat spire. This species presents great variety of colour and

Naturalist,

markings, yellow, green, or brown, and sometimes richly banded, at others reticulated with a darker colour. In the variety of colour it presents it may be compared with the *Helix nemoralis* of our lanes.

The Dog Whelk (*Purpura lapillus*) is very common between tide marks. Only two reversed specimens of this shell are known, and one of them was picked up years ago at Scarborough and came into Mr. Bean's possession. Not long ago I received a letter from a gentleman at Flamborough saying he had got a reversed specimen of the Dog Whelk. I asked him to forward it by registered post, which he did. It proved, however, to be only a reversed specimen of the Common Whelk (*Buccinum undatum*), which is far from rare. Why reversed varieties should be common in some species and very rare in others is a curious point which requires some elucidation.

No shell is more conspicuous between tide marks than the Common Limpet (*Patella vulgata*), much used for bait, and commonly called 'Flithers.' One species of *Chiton* (sometimes called Sea-Woodlouse) is very common in this zone under stones, *Craspedochilus cinereus*. *Gibbula* (= *Trochus*) *cineraria* is also common in these rock pools, the shell which, after it has been rubbed by the waves, appears all pearl, and is in this condition often called 'silver churches.'

The Common Starfish (*Uraster rubens*) and the Dog Crab (*Carcinas mænas*) abound in this zone. In winter the female is found with a great mass of orange-coloured spawn tucked under her tail. It appears as though crabs were once very like lobsters, but some millions of ages ago, had received a shock which had caused them to clap their tails to their bellies like a frightened dog, and had kept them there ever since. Sea-anemones are collected for bait at Scarborough, and the fishermen give them a highly-descriptive name—'Scarpaps.'

The next zone, disclosed only at spring-tides, introduces us to a host of new forms. Here we find in great abundance at Scarborough two species of *Pholas* which live in holes they have excavated in the softer rocks. They are very easily collected on the north shore by the aid of a chisel, as they burrow in great numbers in the clays of the estuarine series which there form the scars.

Zirphæa crispata is the larger species, with very widely-gaping valves. It is a northern shell and occurs in the shelly patches in the Basement Boulder Clay at Bridlington. The

other kind is *Barnea candida*, a frail shell with the valves meeting almost the whole length of the shell.

Three limpet-shaped shells can easily be found in this zone:—*Helcion pellucidum*, an olive-coloured shell, with bright blue rays (a most rare colour in shells), is always found on the fronds of the great olive sea-weed *Laminaria digitata*, a plant which does not grow higher than the low-water mark of neap tides. The other little limpets are the two species of *Acmaea*—*A. testudinalis*, a pretty shell marked with white and brown which is hardly known south of this latitude, and *A. virginea*, a much smaller pink-rayed species. It is common in the sort of lagoon near White Nab, which, I understand, was formed by the excavation of the great slabs of rock which were floated over the Bay to form the outer pier.

Another species of *Chiton* occurs in this zone, both in the north and south bays, viz.:—*Acanthochites fuscicularis*, easily known by the bristly tufts of hair which stand up on either side.

Two crabs are conspicuous. The Edible Crab (*Cancer pagurus*) abounds, but is seldom found of any size till deeper water is reached. Individuals may often be met with in dark crevices, which are quite soft, having just shed their shells.

The other very conspicuous crustacean is the Porcelain Crab, a small active animal with a round carapace and one claw about four times as big as the other, which gives it an exceedingly ludicrous appearance.

The very sluggish Spider Crab, *Hyas araneus*, is also common at Scarborough, a creature so tranquil-minded that the sea-weed and small creatures of various kinds with which it clothes itself in order to escape the observation of its enemies, often flourish as well upon its back as upon the solid rock.

The brittle star of this zone is *Ophiocoma rosula*. Its arms writhe and twist like serpents, and upon the slightest provocation are flung off in the hope that its would-be captor may mistake a part for the whole, so that it is far from easy to procure perfect specimens.

I will now leave the Scarborough rocks and convey you in imagination to Filey Beach, for very little is to be got on Scarborough Sands. Such shells as are dislodged in rough weather doubtless get broken up for the most part upon the scars. At Filey you have a long stretch of smooth sand from the Brig on the north to the chalk cliffs on the south, entirely free from rock.

Many people have an idea that stormy weather is the time for shore-collecting. This is a mistake. When a strong wind blows from the sea the beach is often as bare as a ball-room floor. It is *after* the sea and the wind have subsided that old Ocean casts up his treasures, and shells and crabs and sea-weed from considerable depths are laid at the feet of the delighted collector. Hitherto, we have noticed only univalves. On the beach we find chiefly bivalves that burrow in sand from low water to a depth of many fathoms. At Filey, no species is commoner than *Macra Stultorum*, which is cast up alive in large numbers. The normal form is adorned with ray-like markings. A plain, almost white, variety is called *cinerea*.

Equally abundant is the small thick shining *Donax anatinus* (= *D. vittatus* da Costa). The paper-like shells which strew the sands in such vast numbers are two species of *Tellina*, *tenuis* and *fabula*. The former presents all shades of yellow, orange, and pink; the latter is uniformly white. Perhaps the most beautiful bivalve that occurs at Filey is *Gari* (= *Psammobia*) *ferröensis*. The valves are adorned with crimson rays, somewhat suggestive of the glories of an autumn sunset, when the shell is wet and struck by a sunbeam. Two of the very biggest bivalves the British fauna possesses may be found at Filey after very rough weather, viz., *Lutraria elliptica* and *Cyprina islandica*. The former possesses siphons of extraordinary length, from which it can eject water with amazing force; the other shell is the kind which our grandmothers often used as a scoop for sugar and other small groceries.

Every visitor to the seashore notices the Razor shells. Three species occur at Filey. The common large one is *Ensis* (= *Solen*) *siliqua*; the tiny fragile one is *Cultellus* (= *Solen*) *pellucidus*. *Ensis ensis*, a medium-sized, much-curved species also occurs, but it is not so common as people think; the young of *siliqua* is frequently mistaken for it.

I should like to record the occurrence of *Thracia fragilis* (= *papyracea*) at Filey, both dead and alive, for it has not been included in any recent lists of Yorkshire shells. *Venus striatula* (= *V. gallina* Linn.) is one of the most abundant shells on Filey beach.

A curious crab is always found on Filey beach after storms—*Corystes cassivelaunus*—called the Mask crab, because the carapace bears on it markings which have a ghastly resemblance to a human face. The male has enormous claws, perhaps for fighting purposes like the huge jaws of the stag beetle, or

perhaps to give a firmer hold of the female like the dilated forefeet of the water beetles (*Dytiscus*).

Another deep-water crab often cast up is the cleanser swimming crab, *Portunus depurator*. In this genus the last joint of the largest pair of legs is flattened out like a paddle, suggesting comparison with similarly modified legs in the predaceous water beetles (*Hydradephaga*).

The beautiful crimson 12-rayed Starfish which is often seen on the beach is *Solaster papposa*. Not unfrequently the rays are as many as 14.

I have hitherto mentioned only the larger objects to be met with on the beach, but it will afford also plenty of work for those who use a microscope. To find the tiny molluscs of our seas, gather a few handfuls from the deposits of fine coal which so often lie upon the beach, dry it thoroughly before the fire, and then spread it out upon a sheet of paper in the sunlight. If you run over it with a magnifying glass you will almost certainly find a quantity of delicate little shells, especially species of *Rissoa* and *Cylichna*, as well as the fry of larger species which are often remarkably different in appearance from the full grown mollusc.

This paper gives but a very brief summary of a few of the interesting and beautiful things which the shore-collector can easily gather and study. Our marine fauna and flora have really received such scanty attention that there can be very little doubt that any careful observer living on the coast might add much valuable and interesting information to our present stock, and I have no doubt that many a treasure is brought in on the fishermen's lines only to 'waste its sweetness' (?) in a malodorous ashpit.

MAMMALIA.

Beluga at Scarborough.—On the 19th instant I saw in the bay at Scarborough an example of the Beluga (*Delphinapterus leucas*), about eighteen to twenty feet long. It was about one hundred and twenty yards off the sea wall of the Spa grounds when I saw it first, it being almost high water at the time. I saw it eight or ten times whilst walking parallel to its course on the length of the enclosure on the sea front; it was almost milk-white. This appears to be the first record of this species for Yorkshire.—Sir ROBERT LLOYD PATTERSON, Croft House, Holywood, County Down, Aug. 1903.

RIVER FLIES

AS THE FOOD OF THE PIED FLYCATCHER AND OTHER BIRDS.

Miss MARY L. ARMITT,

Rydal, Westmorland.

THE Pied Flycatchers are in June at their busiest time of family life, as their youngsters are feathering and growing fast. In one nest by the river's brink seven little ones are crowded in a heap, only to be counted by the mottled heads, the yellow beaks, and the speckled breasts. They may be heard squealing hungrily as they anticipate and take the food which the parents bring. This food is almost all gathered from the river, and is mostly the product of its waters. Certain river flies I have long known to be a favourite food with these birds, and three species of them, very similar in appearance, have been kindly named for me by Mr. G. T. Porritt. They are *Chloroperla grammatica*, a large yellow-green species often seen sticking in the beak of the bird; *Isopteryx tripunctata*, a smaller species; and *Isopteryx torrentium*, a darker one, which is doubtless also taken. This year I noticed the first appearance of these flies on May 30th, quite a week later than last year, and since then they have been very abundant. At noon they may be seen rising from the river in numbers, their four wings glittering in sunshine. They make a diagonal course to the foliage, where they creep about, their large wings folded flat. On cold, cloudy days (of which we have had a few without rain) they rise less. The Pied Flycatcher then appears a somewhat sluggish bird, drifting from rock to rock in the low-running stream, and apparently picking up the flies where they lie. But on sunny days it takes them in swift flight from tree to tree, or snaps them off the leaves.

This is not the only food, however, that the bird carries to its youngsters. Their diet is varied, and appears to be more various when the nest is placed farther from the water. Small, hard morsels, that look like beetles, are often taken to the nest, and I have been able to distinguish the Bracken-clock (*Phyllopertha horticola*) and a brown beetle (*Lagria hirta*?) when these are abundant. Spiders, too, are taken. These are almost certainly the *Lycosæ*, or wolf spiders, which the bird watches

for, as it does the beetles, from some low bough, darting then to pick them from the ground. The small May-fly, when abroad, is caught too.

The Pied Wagtails, that have a nest likewise close by, also take large toll of the river flies. The antics of the parent bird over the water as it catches them are amusing to see. Instead of taking them in an easy smooth passage from one perch to another, as the Pied Flycatcher does, it stands on a mossy stone balancing its long tail till it spies one of the shining morsels in air. It then springs upward to give chase, fails at the first shot, follows in a gyrating but ever ascending course till it catches the prey, and drops again to a stone, to repeat the performance. Nine times in succession (without counting its start) did I watch the bird make a successful pounce, before it returned to its nest. Its beak was then loaded with glittering wings, and from the way in which it adjusted its burden from time to time on a stone, it seemed as if the victims were alive and struggling.

It is strange that the Spotted Flycatchers, that are also feeding their nestlings at hand, do not come to the river for these flies, but hawk apparently for smaller fry in dry places. Nor do the Chaffinches ever take them, though the Chaffinch dearly loves a May-fly, and turns quite into a fly-catcher when a small species of these *Ephemera* begin to emerge, from late March days onward; watching for and snapping them up as they rise from the water to seek some vantage post where they may doff their last skin. In fact, it is upon the soft green caterpillar that the Chaffinch relies almost solely as the food of its nestlings, and it is the same with the Titmice. But these birds have been hard put to it this year, when caterpillars have been almost *nil*; and it was, perhaps, as well that a good many of them had short or entirely lost broods, through the addling of the eggs by chill, damp weather. However, one thriving (probably because later) brood of nine Blue Titmice are now being fed, and rarely do I see a green grub carried in. The food taken in is mostly small beetles, spiders, and the larvæ of moths, with an occasional perfect moth. The spiders are probably the *Amaurobius similis*, which lurks everywhere in the crevices of the house-stones. I watched parents of earlier broods search continually the eaves and crevices, and picking out morsels. Though the Blue Titmice feed largely themselves on this diet in the autumn, when spiders are fat and egg-bags are abundant, it is not usual for them to feed their nestlings with it. But this year it is a case of 'necessity knows no law.'

MARINE ZOOLOGY AT FILEY.

T. PETCH, B.Sc., B.A.,

Hedon.

THE following have been identified in the material collected on the Yorkshire Naturalists' Union excursion, at Filey, on 1st June.

Many of the mollusca were represented by empty shells only. *Corystes* was obtained from the fishing boats, and *Coryne pusilla* with *Campanularia volubilis* from shrimp nets; *Nerine*, *Nephthys*, *Cirratulus*, and *Arenicola* were offered for sale for bait. The other species were found on the Brig.

To the list of Hydrozoa gathered on the tide-mark ('The Naturalist,' September 1897, Vol. 21, pp. 275-6) may be added *Halecium halecinum* and *Coppina arcta*.

Porifera.

- Grantia compressa.
- Halichondria panicea.

Hydrozoa.

- Clava multicornis.
- Coryne pusilla.
- C. van benedenii.
- Syncoryne eximia.
- Tubularia indivisa.
- Obelia geniculata.
- O. gelatinosa.
- O. longissima.
- Campanularia volubilis.
- C. integra.
- C. flexuosa.
- Gonothyræa loveni.
- Opercularella lacerata.
- Lafoëa dumosa.
- Sertularella rugosa.
- Sertularia pumila.

Actinozoa.

- Tealia crassicornis.
- Actinia mesembryanthemum.
- Sagartia (troglodytes?).

Echinoidea.

- Echinus miliaris.
- Uraster rubens.
- Solaster papposa.
- Ophiocoma rosula.

Nemertini.

- Amphiporus lactifloreus.
- Lineus marinus.
- L. gesserensis.

Polychæta.

- Harmothoë imbricata.
- Lepidonotus squamatus.
- Sthenelais boa.
- Nereis pelagica.
- N. fucata.
- Nephthys cæca.
- Nerine coniocephala.
- Glycera capitata.
- Cirratulus tentaculatus.
- C. cirratus.
- Lanice conchilega.
- Pectinaria belgica.
- Arenicola marina.
- Siphonostoma diplochaitos.
- Spirorbis nautiloides.
- S. borealis.
- Filigrana implexa.

Gephyrea.

- Phascolosoma vulgaris.

Polyzoa.

- Eucratea chelata.
- Membranipora pilosa.
- M. pilosa var. dentata.
- M. lineata.
- M. aurita.
- M. lacroixii.

Umbonula verrucosa.
 Cribrilina punctata.
 Mucronella peachii.
 Schizoporella unicornis.
 S. hyalina.
 Flustrella hispida.
 Alcyonidium hirsutum.
 Bowerbankia imbricata.
 Pedicellina cernua.
 P. gracilis.

Crustacea.

Hyas araneus.
 Corystes cassivelaunus.
 Portunus depurator.
 Carcinus mœnas.
 Cancer pagurus.
 Eupagurus bernhardus.
 Galathea strigosa.
 Crangon vulgaris.
 Dexamine spinosa.
 Amathilla homari.
 Podocerus variegatus.
 Amphithoë rubicata.
 Gammarus marinus.
 Corophium grossipes.
 Idotea marina.
 Jæra albifrons.
 Janira maculosa.
 Ligia oceanica.
 Balanus balanoides.
 Chthamalus stellatus.
 Verruca strömia.

Pantopoda.

Pycnogonum littorale.
 Phoxichilus spinosus.
 Phoxichilidium coccineum.

Mollusca.

Craspedochilus cinereus.

Acanthochites fascicularis.
 Tonicella ruber.
 Anomia ephippium.
 Mytilus edulis.
 Pecten opercularis.
 Cyprina islandica.
 Kellia suborbicularis.
 Tellina tenuis.
 T. fabula.
 Macoma balthica var. carnaria.
 Donax vittatus.
 Dosinia lupina.
 Venus gallina.
 Tapes pullastra.
 Cardium echinatum.
 Ensis siliqua.
 Saxicava rugosa.
 Zirphæa crispata.
 Patella vulgata.
 Helcion pellucida.
 Acmaea testudinalis.
 Eumargarita helicina
 var. fasciata.

Gibbula cineraria.
 Calliostoma zizyphinus.
 Lacuna divaricata.
 Littorina littorea.
 L. rudis.
 L. obtusata.
 Cingula trifasciata.
 Trivia europæa.
 Buccinum undatum.
 Neptunia antiqua.
 Purpura lapillus.
 Nassa incrassata.
 Eolis papillosa.
 Doto coronata.

Pisces.

Centronotus gunnellus.

FLOWERING PLANTS.

Growth of an Oak.—When looking at the grave of my grandfather (a Halifax man) at Tarporley, Cheshire, a short time ago, I found that an Oak tree planted near the grave by my father and grandfather in 1833, had increased in diameter since then 17 inches. It is now 54¼ inches in circumference three feet above the ground.—HARPER GAYTHORPE, Barrow-in-Furness.

YORKSHIRE NATURALISTS AT BOWES.

O Brignal's banks are wild and fair
 And Greta's woods are green,
 And you may gather garlands there
 Would grace a summer queen.

BOWES, the place chosen for the August Bank Holiday week-end meeting of the Yorkshire Naturalists' Union, has not always been the small, quiet village that it is to-day. It has a history of particular interest. The Romans had a camp there, on the side of a road which is still the main road in the district. A fine Roman bath, in a field near the church, was visited by the members. As an example of the regard paid to antiquities by the average villager, it should be stated that at the present time the bath is used as a quarry from which ready-hewn stones are obtained for building walls with! A Saxon font in the church (though supported on a Roman altar) is evidence of a settlement of Saxons. The Normans, too, had a stronghold at Bowes, the thick-walled keep and moats being still in fair preservation, though the former has suffered at the hands of nineteenth century vandals in search of cheap building material. In more modern times the village had some name on account of the four boarding schools there kept; one of these was the Dotheboys Hall, kept by Squeers, referred to in 'Nicholas Nickleby.' The inhabitants of Bowes, however, do not seem to possess that regard for Dickens which the average person does. Sir Walter Scott, also, in his 'Rokeby,' has added further interest to the district. The very Inn at which the members stayed was an old coaching house, and is but little altered since the days when the coaches swung round the corner into the courtyard. There are certainly more stables and out-houses than are now required, some of which appear neglected; but the Inn itself is but little changed.

In such a district, with fine weather and jovial companions, it is only natural that the Yorkshire naturalists had a very pleasant time on their 174th excursion. Most of the members assembled on Friday evening, and in such numbers as to cause considerable anxiety to the landlord as to bedroom accommodation, notwithstanding the fact that an additional house had been secured for the party. By the following evening every available bed in the village appeared to have been secured, although the party only numbered about thirty.

On Saturday the members started from Lartington Station, and taking Deepdale at the viaduct, followed it up past Nab

Falls, then over the Rigg and the moors to Bowes, the route presenting such a variety of conditions that a naturalist might find much of value, no matter in what particular study he was interested. In Deepdale, near the falls, Mr. E. Hawkesworth obtained a fine tooth of *Petalodus hastingsiæ*, over an inch across, this was from a slab of limestone. In the river were large quantities of St. Cuthbert's beads—broken sections of the stems of encrinites, weathered from their softer matrix.

The Rigg is a ridge of rock resembling an enormous roche moutonnée, running east and west. On this a successful search was made for striæ, two or three striated surfaces being found on the topmost ridges. One of these was of particular interest, as it exhibited a continual scratch, over 30 feet long, which was deeper towards the east, and also had a series of semi-lunar fractures, at right angles to the striæ, each being larger than the preceding, the last one being over a foot across. These fractures had apparently been caused by a large boulder embedded in the glacier, as it travelled due east over the Rigg. The same ice-stream had carried the boulders of Shap granite, a few of which were noted on the ramble.

On Saturday evening a meeting, held at the Unicorn Hotel, was presided over by Dr. R. Braithwaite. Mr. W. Denison Roebuck referred to an effort that was being made to form a natural history society in the district. Mr. J. J. Burton read a paper 'On the Geology and Archæology of the District,' in which many interesting questions were raised. A discussion followed in which several members took part. Dr. Braithwaite then gave a brief address on 'The Study of Mosses,' paying particular attention to nomenclature. He also urged as many as possible to take up that interesting subject. Mr. M. B. Slater exhibited and described some specimens of 'the Pride of Teesdale' (*Potentilla fruticosa*) which he had gathered in Teesdale the previous day.

The following day the members had a pleasant ramble up Sleightholme beck to the 'Trough' (where are some curious pot-holes), over the moors and back to Bowes. In the evening the plants collected during the two previous days were examined and compared.

On Monday the party divided: some walked to Kilmonds Scar and Rutherford Bridge, others took a conveyance. The bryologists, who were particularly well represented, were reinforced and accomplished much good work. The woods and fields also yielded a rich harvest to the mycologists.

At the meeting held in the paddock behind the Unicorn Hotel, on Monday evening, Mr. W. Denison Roebuck presided. After votes of thanks were passed to the landowners and to those who had assisted in the excursion, various reports of the work accomplished were given by Messrs. Hawkesworth, Robertshaw, T. A. Lofthouse, McLean, Gibbs, Slater, Farrah, and the chairman. Some of these follow as appendices. Mr. Hawkesworth referred to the general geological structure of the district, and enumerated the more important finds made on the excursion. Mr. A. G. Robertshaw reported that the lepidopterists had not had much success; he personally had not seen a single butterfly, and the moths noted were all common ones. The two species not localised in the following list were taken by Mr. Lofthouse near Bowes:—

Hepialus sylvanus L.	Bowes.	Camptogramma bilineata L.	
Eupethecia pulchellatus St.			Deepdale.
Small larva in flowers of fox-glove.		Tanagra atrata L.	Deepdale.
		Crambus tristellus.	General.
Melanippe fluctuata L.	Bowes.	Phlytaenia lutealis.	

For the Coleoptera, Mr. Robertshaw also reported that the results of the excursion were meagre, though no great effort at collecting had been made. Mr. Roebuck had found the Death Watch (*Anobium pertinax* L.) in great quantities in his bedroom. The following were noted:—

Pterostichus vulgaris.	Bowes Castle.	Geotrupes slercovarius.	Bowes.
Necrophorus ruspater.		Hylobius abietis.	
	Sleightholme Beck.		

On Monday evening, towards midnight, a small but gallant band complied with a request made by Mr. Roebuck, and armed with a lantern, sticks, and the key of the castle, visited the old Norman keep behind the vicarage in search of slugs. For half an hour or so it appeared as though the president's previous visits had robbed the castle of all its molluscan treasures. An examination of the walls, however, revealed specimens of *Limax flavus* var. *rufescens* and other species, referred to in Mr. Roebuck's report.

Altogether the Bowes excursion can be looked upon as most successful. The various branches of the Union's work were well represented, and the results are particularly valuable from the fact that so little had been previously accomplished in the immediate neighbourhood.

The two photographs accompanying these notes were taken by Mr. J. W. Farrah, and to his father, Mr. John Farrah, we are indebted for the blocks.

T. S.

(APPENDIX A.)

BIRDS AND MAMMALS IN THE BOWES DISTRICT.

KENNETH MACLEAN.

A more suitable day for an excursion could not have been selected than August Bank Holiday. The heat of the sun was tempered with a strong breeze ; you could walk without fatigue and rest without fear of catching cold. From a naturalist's point of view an ideal day in an ideal district.

Down the beautiful Greta Valley it was interesting to watch the numbers of birds, Willow Wrens, Chiffchaffs, Tits, Flycatchers, and many others, all busy destroying the pestilent little gnats which were so freely inserting their poison into different parts of our anatomy. I could not help thinking how unbearable these beautiful stream-side rambles would be were it not for the enormous appetites and restless energy of those beautiful little feathered friends of mankind. The birds were joined in these gnatting expeditions by many large Dragon Flies.

Most of the birds seen were such as could be observed in any good day's ramble, but others were noticed which are by no means common. For instance, the Dipper, Green Woodpecker, Pied Flycatcher, Heron, Jay, Kingfisher, and several others can no longer be considered common.

Quite a colony of House Martins exists in the village of Bowes, and many bright little faces were peeping out of their mud nests. Evidently they were just contemplating exercising for the first time those wonderful wings which, in the course of a few weeks, were to bear them so far away from their native village.

A family of Pied Flycatchers (*Muscicapa atricapilla*) were seen, the young in a very interesting stage of feathering ; many white patches were showing on the back, and on the wing-coverts streaks of yellowish white were observable.

I was pleased to see so many Corn Buntings (*Emberiza miliaria*). This bird is generally called the Common Bunting, and during our walk at Bowes it certainly was the most common of the Bunting family ; but in nine districts out of ten, twenty Yellow Buntings may be seen to one Corn Bunting.

During the day I saw fifty-four different kinds of birds, and to those I have added six, which I had not seen myself, from Mr. Farrah's list, making in all sixty observed during the excursion, as under :—

Naturalist.

Starling.	Carrion Crow.	Great Tit.
Blackbird.	Rook.	Cole Tit.
Thrush.	Jackdaw.	Blue Tit.
Greenfinch.	Pewit.	Wren.
Brown Linnet.	Ring Ouzel.	Dipper.
House Martin.	Willow Warbler.	Heron.
Swallow.	Chiffchaff.	Garden Warbler.
Sand Martin.	Whitethroat.	Gold Crest.
Sparrow.	Stock Dove.	Tree Creeper.
Lark.	Ring Dove.	Grouse.
Tree Pipit.	Rock Dove.	Water Hen.
Meadow Pipit.	Missel Thrush.	Sparrow Hawk.
Corn Bunting.	Robin.	Bullfinch.
Yellow Bunting.	Redstart.	Herring Gull.
Corn Crake.	Pied Wagtail.	Curlew.
Flycatcher (Spotted).	Yellow Wagtail.	Sandpiper.
Flycatcher (Pied).	Magpie.	Swift.
Hedge Sparrow.	Woodpecker (Green).	Snipe.
Whin Chat.	Partridge.	Kingfisher.
Wheat Ear.	Pheasant.	Jay.

MAMMALIA. The following were noticed :—

Footmarks of the Otter.	Field Vole.
Rabbit.	Water Vole.
Hare.	Longtailed Field Mouse.
Shrew.	Brown Rat.
Mole.	Squirrel.

I made an attempt to obtain a specimen of the Field Vole (*Arvicola agrestis*). A dog came out of a hayfield with the tail of one hanging out of its mouth. I seized the tail and pulled, but the dog pulled harder and swallowed the body, leaving the caudal appendage only as my share.

FISH :—Trout, Minnow, and Eel.

AMPHIBIA :—Frog and Toad.

(APPENDIX B.)

NOTES ON THE MOLLUSCA OF THE BOWES EXCURSION.

W. DENISON ROEBUCK, F.L.S.

While the total number of species collected on the Bowes excursion, 1st to 3rd August 1903, was not very large, several of the observations made were of considerable interest. In the quarry at Kilmonds Scar *Hygromia hispida* was abundant. The hummocky ground here looking favourable for the occurrence of *Helicella itala*, a careful search resulted in Mr. J. W. Farrah finding several, and Mr. E. Hawkesworth also met with it.

Here also occurred *Pupa cylindracea*, and Mr. Farrah found *Helix nemoralis*. In Deepdale Mr. Hawkesworth collected *Hygromia hispida* commonly. The Sleightholmedale collections were made by Messrs. Hawkesworth, T. Gibbs, T. Sheppard, and A. Robertshaw, who found *Clausilia bidentata* and *Pyramidula rotundata* commonly. *Cochlicopa lubrica* was also found there by Mr. Hawkesworth, and *Azeca tridens*, *Vitrea alliaria*, *V. crystallina*, and *Arion ater* v. *nigrescens* by Mr. Gibbs. A thrush-stone in this dale yielded fragments of *Helix hortensis* and *Helicigona arbustorum* to Mr. Sheppard. On the Greta at Brignal Banks Mr. Gibbs found *Clausilia bidentata*, which also occurred along with *Cochlicopa lubrica*, *Pyramidula rotundata*, *Helix hortensis*, *Agriolimax agrestis*, *Arion hortensis*, and *Limax arborum* to the writer, in the beech wood near Greta Bridge. The Rev. John Hawell and Mr. T. Ashton Lofthouse collected *Balea perversa* and *Pyramidula rupestris* on the Kilmonds Scar route.

On the excursion programme the occurrence some twenty years ago of gigantic examples of *Arion ater* among the nettles there was noted. This time a very large example of the same species was found along with a gigantic *Limax maximus*, and *Agriolimax agrestis*, *Arion hortensis*, *A. circumscriptus*, *Pyramidula rotundata*, *Hygromia hispida*, *Vitrea cellaria*, *V. alliaria*, and *Pupa cylindracea* were found, the interior of the Castle, covered as it is with loose stones and rank vegetation, being quite a paradise for mollusca. A night search made by Mr. Sheppard with a lantern yielded further results in abundance of typical though small examples of *Limax arborum* and numerous specimens of *L. flavus* var. *rufescens*. This last is perhaps the best find made on the excursion, for not only does it add the species to the fauna of the vice-county York N.W., but the specimens, full grown, are the most richly coloured and characteristic examples of the var. *rufescens* which I have ever seen. The variety had hitherto only been placed on record for four vice-counties, and one of these Bowes Castle examples will probably furnish a sitting for the coloured plate illustrating the species in Mr. Taylor's Monograph. Mr. Sheppard states that the slugs were found, after considerable search with a lantern, crawling on the inside of the walls at about 8 or 10 feet height, and opines that they had emerged from the cracks in the stones of the wall. The total list of mollusca collected included 7 slugs and 15 land shells (22 altogether), and not a single water-shell was noted, no search having been made for them.

(APPENDIX C.)

THE FLOWERING PLANTS OF BOWES.

JOHN FARRAH.

It is not my intention to write a string of dry scientific names in the body of this article ; if these appear at all it will be at the end, in a list to themselves, where they will stand in stern forbiddingness, the bugbear of many a would-be botanist. Bowes is delightfully quiet and restful, and I pray God that it will for ever remain so. The motor-car—the latest curse inflicted upon the country—is comparatively rare. I used to have a contempt for cyclists ; now I am beginning to respect them. They glide along noiseless and stinkless, and comparatively dustless, and the tinkle of their bells is heavenly music compared with the horn of the motor.

Just now I wish for the descriptive power of Scott or Richard Jefferies, so that I might do slight justice to the many charms of this historic and picturesque part of grand old Yorkshire.

Some of us arrived on Friday, the 31st July. Our first walk was to the Castle. Very little of the original structure remains, but that which does remain is grand and grim.

The first plant to attract our attention was the common or deadly Hemlock, the umbellifer that is credited as being the one that closed the career of Socrates, and, let us hope, ushered him into a better world than this—I don't say a more beautiful one.

Sweet Cicely grew luxuriantly on the north side of the ruin ; it has the taste of aniseed, and was used in the concoction of salads and for flavouring cakes long before candied lemon was thought of or the spices of the East were brought to us. The smell is said to attract bees, and many beekeepers rub the inside of an empty hive with the leaves in order to induce a swarm to enter. Along with it in great profusion grew the blue Meadow Cranesbill (so named from the exceedingly long beak, which plays a most important part in the distribution of the seeds), the common Nettle, tall Cock's-foot-grass, False Oat-grass, and many other more lowly grasses, and forming a carpet for them was the Mouse-ear Hawkweed, with flowers of bright orange, silvery fringed foliage, and ivory midrib. Purple-clustered Bellflower and golden Stone-crop also gladdened our eyes. The dry limestone 'courses' of the walls, where one would think that even the lower forms of plant life couldn't exist, reveal Maidenhair Spleenwort with feathery frond, and Wall-rue in clustered leathery tufts. On the walls about, where

mosses have grown and decayed, leaving a matrix of virgin soil as the heritage of higher forms of plant life, we find in abundance the withered stems of the vernal Whitlow Grass; to the foot-stalks are still attached the middle valve, an exact miniature of the silvery 'Honesty' used for decorating the rooms of poor and rich.* The two outer valves of the Whitlow Grass sprang off one dry day last April; the seeds then set at liberty are now snugly ensconced in the crevices of the walls; when the sunshine of February comes round they will wake up and repeat the process.

Several other species of Crucifers are here in company—Shepherd's Purse, hairy Rock Cress, thale Cress, and hairy Bitter Cress. Here and there on these walls are the rosettes of several Hawkweeds, but as yet no flowers. Rue-leaved Saxifrage is also abundant upon old walls: Gerarde calls it 'Naile Grass,' and adds—'it hath been taken to heale the disease of the nailes called a whitlow, whereof it tooke his name, as also naile wort.'

Many of the walls surrounding the houses and gardens in Bowes are now clothed thickly with the remains of the lowly plants I have named, which helps one to imagine how beautiful they are in the months of April and May. Their profusion is indicative of a very pure atmosphere. The breezes are, I think, the balmiest that I have ever breathed. All the time we were there fresh air and fresh winds and sunshine were abundant. It was a grand treat to stand in the midst of haymakers hard at work under these conditions, and drink in as much as possible of the re-invigorating air.

The lane-sides were a constant source of delight, or I should have said road-sides, for they are broad, the roads themselves are not wide, but they are wide enough for the traffic, and are kept in excellent repair; plenty of hard limestone abounds for this purpose. It is owing to this fact in a great measure that vegetation on the wide grass margins that line each side of the roads is so abundant and varied. Many of our rarer wild flowers grow in the greatest profusion, yet they are quite normal in form and colour. This cannot be said of very many plants that grow in narrow and steep-sided valleys or gorges where moisture is usually abundant. This appears to be the case in Deepdale, judging from several specimens brought in by various members. Here the giant Bell-flower, or Throatwort as I like to call it, grows to a very large size and produces

* It is called 'Honesty' from its transparency. We can see through it. From this I conclude that it did not originate in Yorkshire.





Veterans.

abundance of fine blooms, but these lack the rich colour of those grown in more exposed and drier habitats. But, again, in Deepdale the blooms of the melancholy Thistle are the largest and finest in colour that I have ever seen. The student of nature has yet many problems to solve.

Returning to the question of the road-side vegetation, I attribute its abundance, variety, and constancy to the following causes:—First, pure air, which, owing to the elevation—about a thousand feet—is always in motion; the result of this is that wind-fertilised plants are invariably pollinated. Second, insect-fertilised plants receive constant attention, because of the number of nectar-producing flowers. Third, all the roads have at each side a high well-built stone wall—hedges are the exception; these act as a flue, along which the wind can career, and does. It acts as a road sweeper in dry weather, clearing to right and left the pulverised limestone and the dried horse droppings, which, combined, make a rich manure. At the same time all ripe seeds are dispersed, first in one direction then another, many of them eventually find a congenial resting-place in the new and fertile layer of soil deposited by the winds. Thus the species are perpetuated, and that in increasing numbers, and the area every year is extended. Walls are better propagators of plants than hedges, for the very obvious reason that the wind cannot rush through them. Let me here say that wind is at one and the same time the greatest enemy and the greatest friend to vegetation. It is a very easy matter to tell the sunny or shady side of a road by the vegetation, especially a stone-walled road. A wall absorbs more of the sun's heat than a hedge, consequently it gives off more heat than a hedge, and the plants benefit to a corresponding degree.

The road from Bowes to Rokeby stretches in a long straight line for about four miles, and for all practical purposes runs due east and west. This is the road with which I made myself best acquainted during my short stay at Bowes. Its fascination was so great that though I started twice to go as far as Rokeby I never reached there.

My first ramble along this road was in the company of Dr. Braithwaite and Mr. Slater, both of them renowned and veteran bryologists—one of them over eighty, the other nearing it—and of our most worthy President. This fact alone is sufficient to impress upon one's memory the delights then experienced.

The main body of the naturalists had gone to Deepdale. The weather was glorious, brilliant sunshine, fresh west wind,

and magnificent cloud effects. Occasionally a huge rain cloud obscured the sun for a few minutes, sprinkling upon the landscape and upon us a few drops as a parting blessing before being absorbed into the surrounding atmosphere. Stately piles of cumulus, like snow-capp'd mountains, ranged in irregular order the circle of the horizon, no words can describe the subtlety of their colouring, and only the pencil of a Turner could faintly depict them. Under these conditions life is ideal, and we feel sorry that there are not more lovers of nature and fewer jerry-builders.

About two miles from Bowes is 'Hulands' Quarry (what is the etymology?), on the north side of the road; here we turned in, and moss gathering, snail and slug hunting, and flowering plant observations were for some time most enthusiastically carried on, then, after mental requirements were partly satisfied, the grosser part of our nature called for attention. After lunch the photographer of the party secured portraits of the worthies mentioned. Wild Thyme bloomed in glorious profusion, much to the delight of the bees and ourselves. Autumnal Gentian or Felwort was abundant, but the most forward plants had not yet unfolded their five-toothed corollas.

On the road-sides, in damp places, Marsh Ragwort flaunted its golden stars; they were large enough to fill with envy the breast of the horticulturist. Great Hedge Bedstraw climbed the walls and covered the bushes with its snowy, honey-scented blossoms for miles along the road; its cousin, Yellow Bedstraw or Cheese-Rennet, abounded on the dry banks and hung carelessly from many a crevice in the dry limestone rock. This plant was formerly used in the manufacture of cheese, but now the cheesemaker procures a substitute from the chemist. In the Bowes district a large quantity of cheese is made; and everywhere this plant is abundant, but few if any of the people know its properties. The railway has ousted the stage coach, and the chemist has ousted the herbalist.

A delightful feature of this road is the great number of small quarries that line its sides. These form a portion of the roadside, into which you can walk from the grass verge by a gentle slope; presumably they were opened for the purpose of getting stone with which to repair the road close by. Many years must have elapsed since they were worked, for Nature has claimed them, and has in her wantonness and waywardness made of them ideal rock-gardens, which appeal far more to the student of Nature than any man-made collection of plants,

wonderful and interesting as many of these are, yet they always bear the stamp of artificiality more or less, and the naturalist turns to his wildings to make his soul rejoice. This, I think, proves that a genuine naturalist is only a partly-reclaimed savage; it is impossible for a real naturalist to love conventionality or even to tolerate it. The floors of these little dells produce a thick crop of tall grasses, to whose stems cling the tendrils of the Tufted Vetch and the Meadow Vetch, the rich purple of the flowers of the one, and the bright yellow of the other, intermingled with the sober shades of the many grasses, form a delightful sight.

None of these natural rock-gardens on account of the limestone formation hold water, but in a damp, shady corner of some of them is a bed of huge-sized Nettles. Do any of my readers eat Nettles? I mean young ones that appear in February and early March. Try them when the time comes round; boil them, strain them dry, add salt, pepper, and butter—don't forget the last—and with well-fed English roast beef they are fine. This common plant, which loves the habitations of man, for you seldom find it far away from them, was formerly in England and Scotland put to many uses which are now obsolete. The fibre was made into thread, woven into sheets, tablecloths, etc. The roots produce a yellow dye which was used in colouring yarn and staining Easter eggs.

The sides are clothed with Giant Bedstraw, clustered Bellflower, Lady's Fingers, Hoary Ragwort, Slender-flowered Thistle, Goat's-beard, Great Knapweed with blooms of large size and rich colour, here and there a rose bush and a bramble bush; but this particular part of the district of Bowes is very thinly populated with members of the Rose family. Why? Any fool can ask a question, but frequently it requires the wisdom of a philosopher to answer it.

'Good King Harry,' 'All-good,' or 'Oak-leaved Goosefoot' is another useful plant that I often met with on this roadside. Like many other useful things, this plant is not showy or attractive; many people call it a 'docken,' but under its humble guise lie many virtues. Try it in early spring, when the foliage is young; in my opinion, and that of many of my friends, it is infinitely superior to the sweated and artificially produced Spinach sold by greengrocers, a large hamper of which when boiled does not fill an ordinary vegetable dish. 'Ther's nowt in it,' as a gardener once said to me.

Common Bistort, Snake-weed, Patience Dock, Pull Dock, Easterledges, etc., is another most useful and appetising vegetable, a near relative to 'Good King Harry.' It was noticed growing at Brignall Banks by Mr. Gibbs. It grows abundantly in several places near Harrogate, and each spring my family and myself partake of it freely, and enjoy it.

The meadows that remained uncut undulated in response to the wind. Rough Hawkbit, with large golden discs, formed a vivid contrast to the dark purple clubs of the Great Burnet. Both these plants were abundant in the meadows generally. Great Burnet used to be cultivated extensively in most of our Yorkshire dales as a fodder plant; for some reason it has fallen into disfavour with the farmer, but it still persists, and in doing so forms a curious yet beautiful object when growing in quantity as it does at Bowes amongst our native grasses. We missed from the meadows the upright Buttercup, Black-knapweed, and the silver and gold of the Great Ox-eye, or Moon-penny, which are so abundant upon water-holding clayey subsoils. One of the prettiest sights was a bed of Watercress in full bloom. It was quite fifty yards long by three yards wide, with a large pond at the upper end filled with the same plant, and fed by a copious spring of very clear water. It flows in Hogarth's 'Line of Beauty.' The Cress quite filled the brook and repeated its contour. So dense were the flowers that no water could be seen, and the sight from the hillside a short distance away was charming, but at the same time puzzling. Close acquaintance revealed the identity of our well-known friend, and an excellent photograph was obtained of it in all its glory. Thousands of blooms of the Forget-Me-Not intermingled, but so dense were the flowers of the Crucifer that these were only observable at close quarters.

Bowes and its neighbourhood is by no means thickly wooded, yet in the village there are many fine specimens of the Sycamore and the Ash, some of them of exceptional size, particularly so when we remember the elevation. The number of species of our native forest trees is limited, especially fine individual specimens. I don't remember seeing anything like a respectable Oak. In Sleightholme-dale is a very fine group of the Norwegian Spruce. Mr. Gibbs, in his report to me says, the Ash is the 'prevailing' tree, and I quite agree with him.

My thanks are now given to all members present for their courtesy in bringing specimens and recounting 'finds.' If any or all of them can add to the list I shall be glad. During a stay

of a few days it is possible only to make a very superficial botanical survey, and I would here point out that it is quite as important to note the plants that don't appear—sometimes more so—as it is to register those that do appear.

I should like to persuade the rising generation of botanists to study Watson and Baker on the distribution of our flora, and each one to concentrate his observations on the plant phenomena of his respective district. The mere making of a list of plants is the alphabet of botany, and is, of course, absolutely necessary to a beginner. He must learn to know his plants, but after that we want to know why certain plants grow in one habitat, and not in another which appears to be quite as suitable. Then, again, we want to know their economy—that is to say, the purpose that each serves where it grows. When this is done it will throw more light upon the question of cultivating plants that are necessary to the well-being of mankind. This includes the production of the most suitable food required for the consumption of the domestic animals that supply us with the meat which has become absolutely necessary to the majority of people who reside in northern latitudes. I want the botanical members of the Y.N.U. to take up the study seriously, and not only as a pastime. If this was carried out in its entirety I am sure that the land contained in the United Kingdom would produce sufficient food to amply feed its present population.

An enormous gain would thus be made upon the conditions now prevailing. One thing in particular I should like to warn the young student against, and that is spending too much time in determining varieties and sub-species, for no plant, especially a wild plant, will grow to the order of a botanist, no matter how eminent that botanist may be. Nature often appears to take a delight in teasing and puzzling her students, but eventually those who are faithful to her reap their reward. The minute differences that exist between many described species of roses, brambles, and willows are so slight as not to warrant the distinctions made. Life is so short that I think it unwise to spend it in describing characters that often are not permanent. We might as well try to describe each separate blade of grass, for no two are exactly alike. Finality must be acknowledged, why not draw the line at the point I have tried to indicate, and hark back with the intention to learn more of the knowable and the useful. With the object of mere collecting no thoughtful botanist has any sympathy. The collector could, if he would, often explain why certain plants are rare, but on the other hand

he can seldom tell you anything of their life history. His cupidity uses all the time and energy at his disposal.

When out to observe don't go too far or too fast ; haste does not go hand in hand with scrutiny and discrimination.

I have outstript the bounds of an ordinary botanical report, but I have done it with the object of trying to rouse the flowering plant members. This section has done little work, with one or, perhaps, two exceptions, for several years. The Moss men and the Fungus men have done good and lasting work, true ; they have better chances of finding new species than has the flowering plant man. But if every species is known, there is still a lot to learn about each. Let us try to learn it.

And Nature, the dear old nurse,
Took the child upon her knee,
Saying, ' Here is a story book
Thy Father hath written for thee.

Come wander with me,' she said,
' Into regions yet untrod,
And read what is still unread
In the manuscripts of God !'

And he wandered away and away
With Nature, the dear old nurse ;
Who sang to him night and day,
The rhymes of the universe.

LONGFELLOW on AGASSIZ.

Yes ; Bowes is a delightfully restful place. I am looking forward to going there again. The only person I saw in a hurry during my stay was our most respected President, and he was then going to catch the train to Lartington. Bowes is God's country !

The following is a list of the principal plants seen. The nomenclature is that of the third edition of ' Hooker's Student's Flora of the British Islands,' Macmillan & Co. 1884. The author in his preface says :—For the plants regarded as composing the British Flora proper I have mainly followed the ' London Catalogue of British Plants,' Seventh edition, 1874 ; being fully satisfied that I should thus best serve the interests of British Botany :—*Ranunculus fluitans*, *R. flammula*, *R. acris*, *R. repens*, *R. bulbosus*, *Caltha palustris*, *Papaver Rhæas*, *Capsella Bursa-pastoris*, *Draba verna*, *Cardamine pratensis*, *C. hirsuta*, *Nasturtium officinale*, *Sisymbrium thalianum*, *S. alliaria*, *Helianthemum vulgare*, *Viola canina*, *V. lutea* (also the purpled flowered variety), *Polygala vulgaris*, *P. depressa*, *Silene inflata* (this plant lingers sparingly ; a survival of the corn-growing era), *Lychnis flos-*

Naturalist,

cuculi, *L. diurna*, *Sagina procumbens*, *Arenaria serpyllifolia*, *Stellaria media*, *S. holostea*, *S. graminea*, *Cerastium glomeratum* (this is another struggling survivor from the corn age; we found it growing sparingly on the accommodation roads, where competition was not vigorous), *Cerastium triviale*, *Linum catharticum*, *Tilia parvifolia*, *T. grandifolia*, *Hypericum quadrangulum*, *H. pulchrum*, *H. hirsutum*, *Acer pseudo-platanus*, *Geranium sylvaticum*, *G. pratense*, *G. columbinum*, *G. Robertianum*, *G. lucidum*, *Ulex europæus*, *Genista tinctoria*, *Ononis arvensis*, *Anthyllis vulneraria*, *Medicago lupulina*, *Trifolium repens*, *T. pratense*, *T. procumbens*, *T. minus*, *Lotus corniculatus*, *L. major*, *Hippocrepis comosa*, *Vicia cracca*, *V. sepium*, *Lathyrus pratensis*, *Prunus spinosa*, *P. Padus*, *Spiræa ulmaria*, *Geum urbanum*, *G. rivale*, *G. intermedium*, *Potentilla anserina*, *Fragaria vesca*, *Rubus idæus*, *R. fruticosus*, *R. leucostachys*, *R. Kœhleri*, *R. corylifolius*, *R. cæsius*, *Rosa mollissima*, *R. canina* (Bramble bushes and Wild Rose bushes are rarely met with on the limestone in the immediate neighbourhood of Bowes), *Sanguisorba officinalis*, *Poterium Sanguisorba*, *Alchemilla vulgaris*, *Cratægus oxyacantha* (not frequent; I don't remember seeing the Crab *Pyrus malus*?), *Pyrus aucuparia*, *Epilobium angustifolium*, *E. hirsutum*, *E. montanum*, *E. palustre*, *Circæa lutetiana*, *Ribes grossularia*, *Sedum acre*, abundant. (On cottages in old villages it is usual to see a big clump of House-leek, but I did not see any at Bowes; it is still used as a cure for 'thrush,' an infantile complaint often occurring immediately before they cut their teeth; the juice is squeezed out of the fleshy leaves on to the gums and has a cooling effect.) *Saxifraga tridactylites*, *Chrysosplenium oppositifolium*, *Sanicula Europæa*, *Conium maculatum*, *Bunium flexuosum*, *Silaus pratensis*, *Angelica sylvestris*, *Heraclæum Sphondylium*, *Torilis Anthriscus*, *Anthriscus sylvestris*, *Chærophylum temulum*, *Myrrhis odorata*, *Sambucus nigra*, *Lonicera Periclymenum*, *Galium verum* (very abundant), *G. cruciatum*, *G. palustre*, *G. saxatile*, *G. mollugo* (in the greatest profusion), *Asperula odorata*, *Valeriana officinalis*, *Scabiosa succisa*, *S. columbaria*, *Tragopogon pratensis*, *Leontodon hispidus*, *L. autumnalis*, *Lactuca muralis*, *Sonchus asper*, *Hieracium Pilosella*, *H. murorum*, *Taraxacum officinale*, *T. palustre*, *Lapsana communis*, *Arctium minus*, *Carduus tenuiflorus*, *C. lanceolatus*, *C. eriophorus*, *C. palustris* (also variety with white flowers), *C. arvensis*, *C. heterophyllus*, *Centaurea nigra*, *C. Scabiosa*, *Petasites vulgaris*, *Tussilago Farfara*, *Solidago virga-aurea*, *Senecio vulgaris*, *S. erucifolius*, *S. Jacobæa*, *S. aquaticus*, *Bellis perennis*,

Chrysanthemum *Leucanthemum*, *Matricaria* *inodora*, *Achillea* *Parmica*, *A. millefolium*, *Campanula* *rotundifolia*, *C. latifolia*, *C. glomerata*, *Erica* *Tetralix*, *E. cinerea*, *Calluna vulgaris*, *Vaccinium myrtillus*, *Ilex aquifolium*, *Fraxinus excelsior*, *Gentiana amarella*, *Veronica anagallis*, *V. Beccabunga*, *Veronica officinalis*, *V. chamædrys*, *V. arvensis*, *V. Buxbaumii*, *Euphrasia officinalis*, *Rhinanthus Crista Galli*, *Pedicularis sylvatica*, *Scrophularia nodosa*, *Digitalis purpurea*, *Mentha hirsuta*, *M. arvensis*, *Thymus serpyllum*, *Origanum vulgare*, *Teucrium Scorodonia*, *Ajuga reptans*, *Stachys Betonica*, *Prunella vulgaris*, *Myosotis repens*, *M. cæspitosa*, *M. versicolor*, *Pinguicula vulgaris*, *Primula veris*, *Lysimachia nemorum*, *Plantago major*, *P. media*, *P. lanceolata*, *Chenopodium Bonus-Henricus*, *Polygonum Bistorta*, *P. aviculare*, *Rumex obtusifolius*, *R. aquaticus*, *Euphorbia Peplus*, *Mercurialis perennis*, *Urtica urens* (abundant in gardens and waste places in the village), *Urtica dioica*, *Ulmus montana*, *U. campestris*, *Quercus Robur*, *Fagus sylvatica*, *Corylus avellana*, *Alnus glutinosa*, *Betula alba*, *B. verrucosa*, *Populus alba*, *Salix caprea*, *S. phylicifolia*, *Pinus sylvestris*, *Taxus baccata* (in Sleightholmedale, and there is a very fine specimen in the garden of the Unicorn Inn), *Listera ovata*, *Orchis maculata*, *Allium ursinum*, *Juncus conglomeratus*, *J. effusus*, *J. glaucus*, *J. acutiflorus*, *J. squarrosus*, *Luzula sylvatica*, *L. pilosa*, *Eleocharis cæspitosa*, *Anthoxanthum odoratum*, *Phleum pratense*, *P. Boehmeri*, *Alopecurus pratensis*, *A. geniculatus*, *Agrostis canina*, *A. vulgaris*, *Aira cæspitosa*, *A. flexuosa*, *Avena flavescens*, *Arrhenatherum avenaceum*, *Holcus lanatus*, *H. mollis*, *Melica uniflora*, *Glyceria aquatica*, *G. fluitans*, *Poa annua*, *P. pratensis*, *P. trivialis*, *P. nemoralis*, *Briza media*, *Cynosurus cristatus*, *Dactylis glomerata*, *Festuca ovina*, *F. gigantea*, *Bromus erectus*, *B. asper*, *Brachypodium sylvaticum*, *Lolium perenne*, *Nardus stricta*, *Polypodium vulgare*, *Cystopteris fragilis*, *Lastræa Filix-mas*, *L. dilatata*, *Athyrium Filix-fœmina*, *Asplenium Trichomanes*, *A. ruta-muraria*, *Scolopendrium vulgare*, *Blechnum boreale*, *Pteris aquilina*, *Equisetum arvense*, *E. palustre*.

All the above plants have been seen and identified by several observers, amongst them Dr. Braithwaite and Mr. Slater, who know the flowering plants as well as they know the mosses and hepatics.

The absence of plants that accompany corn growing is particularly noticeable. No corn whatever is grown within some miles of Bowes, the meadows and the pastures are kept well manured and in good order, and heavy crops of grass are produced. It is interesting and instructive to note how soon



Four F's, L.S.:
John Farrah, Dr. R. Braithwaite, M. B. Slater, W. Denison Roebuck.

these weeds of cultivation cease to appear after the plough is put aside, and proves how necessary the assistance of man is to enable them to live; when left to themselves they are soon overcome by stronger and more aggressive neighbours. Doubtless there are large quantities of the seeds of these plants lying dormant under the beautiful green carpet that surrounds Bowes, and if ever the sod is turned again the probability is that they will re-appear, many of them in large numbers, for the vitality of the seeds of many species of plants is very remarkable.

Not a single Potamogeton was noted; this may be accounted for by the non-existence of ponds or slow-running streams.

The Sedges, too, were equally scarce, so far as I know not one was seen; these are facts that require solving. Many other instances of absence could be adduced, but I hope I have said sufficient to provide food for a little thought which may produce fruit at future meetings.

(APPENDIX D.)

MOSES AND HEPATICS OF BOWES AND DISTRICT.

WILLIAM INGHAM, B.A.

The week-end excursion to Bowes has proved a very great success with these plants.

It is of interest to note that the Harpidioid Hypna were entirely absent from the routes traversed, and that the Sphagna or bog mosses were seen only in crossing over the moor from Sleightholme Beck. Even these latter were scarce and of four species only, viz., *Sphagnum cymbifolium*, *S. acutifolium* var. *viride*, *S. fimbriatum*, and *S. recurvum* var. *mucronatum*. It will be of advantage if I give the mosses and hepatics in classes, according to the routes traversed. They are as follows:—

I. WALLS NEAR BOWES.—*Barbula unguiculata* Hedw., *B. revoluta* Brid., *Tortula intermedia* Berk., *T. muralis* Hedw., *Grimmia pulvinata* Sm., *Orthotrichum anomalum* var. *saxatile* Milde, *Bryum capillare* L., *B. caespitium* L., *Racomitrium canescens* Brid., *Encalypta streptocarpa* Hedw., *Neckera complanata* Hübn., *Pleuropus sericeus* Dixon, occurring in very large masses everywhere around Bowes, and forming the dominant moss of the district. I believe that nowhere in Yorkshire is this moss found in such abundance as at Bowes; *Amblystegium filicinum* DeNot and *Amb. serpens* B.&S. by the road-side, and *Hypnum cupressiforme* L., next in abundance to *Pleuropus sericeus*.

2. GILMANSCAR CLIFFS.—The most interesting moss here is *Encalypta rhabdocarpa* Schwgr., which I found growing on carbonaceous shale on the Friday, and on the cliffs facing the Greta. On the next day Mr. Slater and Dr. Braithwaite found the same moss in a quarry on the opposite side of the cliffs. Both gatherings were in fruit. Another moss, new to North Yorkshire is *Weisia crispata* C.M., which is dominant on the shale. I have found this rare moss in Weardale and in the Jackdaw Crag Quarry, Tadcaster. Other mosses of the cliffs are *Barbula rubella* Mitt., *B. revoluta* Brid., *Tortula intermedia* Berk. c.fr., *Fissidens viridulus* Wahl. c.fr., *Encalypta streptocarpa* Hedw., *Fissidens decipiens* DeNot., *Grimmia apocarpa* Hedw., *Ditrichum flexicaule* Hpe., *Mnium rostratum* Schrad., *Bryum capillare* L., *Anomodon viticulosus* H.&T., *Trichostomum tortuosum* Dixon, *Camptothecium lutescens* B.&S., *Pleuropus sericeus* Dixon, *Neckera complanata* Hübn., *Plagiothecium sylvaticum* B.&S., *Amblystegium filicinum* DeNot., *Brachythecium rutabulum* B.&S., *Hypnum cuspidatum* L., and *H. molluscum*, There were two hepatics :—*Plagiochila asplenoides* and *Porella platyphylla* L.

3. DEEPDALE.—(1) MOSSES.—*Dichodontium pellucidum* Schp., *Tortula subulata* Hedw. approaching *T. angustata* Wils., *Grimmia apocarpa* v. *pumila* Schimp., *Weisia rupestris* C.M., *Fissidens adiontoides* Hedw., *F. taxifolius* Hedw., *Grimmia pulvinata* Sm., *Barbula spadicea* Mitt., *Dicranella varia* Schimp., *D. squarrosa* Schimp., *Trichostomum tortuosum* Dixon and *T. tenuirostre* Ldb., *Dicranum scoparium* Hedw., *Orthotrichum cupulatum* Hoffm. and *O. anomalum* v. *saxatile* Milde, *Mnium punctatum* L. and *M. undulatum* L., *Barbula tophacea* Mitt., *Webera albicans* Schimp., *Barbula cylindrica* Schimp., *Porotrichum alopecurum* Mitt., *Isothecium myurum* Brid., *Climacium dendroides* W.&M., *Bryum pseudo-triquetrum* Schwg., *Philonotis fontana* Brid., *Fontinalis antipyretica* L., *Heterocladium heteropterum* B.&S.; a *Ulota*, barren; *Plagiothecium denticulatum* B.&S., *P. depressum* Dixon, *Brachythecium rutabulum* B.&S. and *B. rivulare* B.&S., *Hypnum palustre* L., *H. uncinatum* Hedw., *H. cupressiforme* L., *Neckera complanata* Hübn., *Brachythecium plumosum* B.&S., *Eurhynchium crassinervium* B.&S.; *Barbula rigidula* Mitt., with its characteristic gemmæ; *Weisia tenuis* C.M., in fruit; *Fissidens pusillus* Wils. var. *madidus* Spruce, *Barbula rubella* Mitt., *Anomodon viticulosus* H.&T., *Brachythecium velutinum* B.&S., *Cinclodotus fontinaloides* P.B., *Plagiothecium undulatum* B.&S., *Amblystegium filicinum* DeNot,

Eurhynchium Swartzii Hobk., *E. prælongum* B.&S., *E. striatum* B.&S., *E. rusciforme* Milde., *Hypnum commutatum* Hedw. c.fr., *H. molluscum* Hedw., *H. commutatum* var. *virescens* Schimp., *H. uncinatum* Hedw. c.fr., *Hylocomium triquetrum* B.&S., *Fumaria hygrometrica*, *Ceratodon purpureus*, *Ditrichum flexicaule*, and *Hypnum Schreberi* Willd. (2) HEPATICS.—*Plagiochila asplenioides* L. var. *Dillenii* Tayl., *Marsupella emarginata* var. *minor* Carr. and type, *Chiloscyphus polyanthos* L., *Jungermania riparia* Tayl., *Blepharostoma trichophyllum* Dill., *Nardia scalaris* Schrad., *Cephalozia Lammersiana* Hüben., *Scapania nemorosa* L., *Metzgeria conjugata* Lindb.

Mr. Barnes, who knows the district well, reports the following interesting and rare mosses, chiefly from Upper Deepdale :—*Mnium stellare*, *Seligeria setacea*, *Bartramia ithyphylla*, *Bryum lacustre*, *B. concinnum*, *Orthotrichum obtusifolium*, *O. tenellum*, *O. fastigiatum*, *Bartramia Oederi*, *Eurhynchium pumilum* and *E. Sprucei*, *Trichostomum nitidum* Schimp., *Orthothecium intricatum*, *Hypnum incurvatum*, *H. Sommerfeltii*, *Philonotis calcarea* (found by Mr. Beesley), *Amblystegium confervoides*, and *Zygodon viridissimus*.

4. SLEIGHTHOLME BECK.—(1) MOSSES.—*Zygodon Stirtoni* Schimp., a very rare moss; *Z. Mougeotii* B.&S., in immense masses; *Barbula fallax* Hedw. and *B. spadicea* Mitt., both in good fruit; *B. cylindrica* Schimp., *B. rubella* Mitt.; *Weisia rupestris* C.M. c.fr., both tall and short forms; *Dicranella squarrosa* Schimp., *Dichodontium pellucidum* Schimp., *Fissidens decipiens* DeNot, *Polytrichum commune* L., *Trichostomum tortuosum* Dixon, *Dicranum scoparium* var. *turfosum*, *Polytrichum aloides* Hedw., *Racomitrium canescens* var. *ericoides* B.&S., *Ulotia Bruchii* Hornsch., *Orthotrichum anomalum* var. *saxatile* Milde., *Racomitrium aciculare* Brid.; *Anomodon viticulosus* H.&T., in immense masses on the upper cliffs; *Porotrichum alopecurum* Mitt., *Philonotis fontana* Brid., *Neckera crispa* Hedw., *Climacium dendroides* W.&M., *Camptothecium lutescens* B.&S., *Eurhynchium crassinervium* B.&S., *E. striatum* B.&S., *E. rusciforme* Milde., *Hypnum falcatum* Brid.; *H. commutatum* Hedw., in immense masses; *H. molluscum* Hedw., *H. ochraceum* Turn., *H. cupressiforme* L., *Neckera complanata* Hübn., *Hypnum palustre* L.; *Pleuropus sericeus* Dixon, very abundant, carpeting large stones; *Hylocomium triquetrum* B.&S. (2) HEPATICS.—*Lejeunea Rossettiana* Massall, a very interesting and rare hepatic; *Porella rivularis* Nees, very fine on the upper cliffs; *Frullania dilatata* L., *Lophocolea bidentata* L. var., *Plagiochila*

asplenioides v. *Dillenii* Tayl., *Jungermania riparia* Tayl., and *Metzgeria pubescens* Schrank.

5. BY THE GRETA AND BRIGNALL BANKS.—(1) MOSSES.—*Dicranum scoparium* Hedw. c.fr., *D. fuscescens* var. *falcifolium* Braith., *Campylopus fragilis* B.&S., *Weisia verticillata* Brid., a very rare fruiter, but on Brignall banks in abundant fruit; *Mnium punctatum* L., approaching var. *elatum* Schimp.; *Bryum obconicum* Hornsch., *Plagiothecium pulchellum* B.&S.; *Leucodon sciuroides* Schwgr.; *Brachythecium velutinum* B. & S.; and *Hypnum uncinatum* Hedw. c.fr. (2) HEPATICS.—This valley is very rich in hepatics. Those examined are: *Lepidozia reptans* L., *Kantia trichomanis* L., *Cephalozia bicuspidata* L., *Eucalyx hyalina* Lyell, *Jungermania turbinata* Raddi, *J. bantriensis* Hook., *Plagiochila asplenioides* L., *Scapania nemorosa* L., *S. irrigua* Nees, and *S. curta* Mart., the last very interesting and infested with gemmæ. The above, for the Greta Valley, do not represent all the gatherings, but those only that I have examined under the microscope. The remaining plants unexamined are chiefly hepatics.

(APPENDIX E.)

MOSS AND HEPATICS IN GRETA DALE.

M. B. SLATER, F.L.S.

In August 1879 I paid a visit of a few days to Rokeby, and then explored to some extent the valley of the Greta towards Bowes. On that occasion I met with a moss growing in a quarry about two miles from Bowes, which on examination when I got home I made out to be *Encalypta rhadocharpa* Schwægr. The moss was in such bad condition I did not feel justified in recording it then as one new to North Yorkshire, although I felt fairly certain it was the plant. On my visit to Bowes on this occasion I was naturally very desirous to meet with it again. In company with my friend, Dr. R. Braithwaite, we made a special ramble in search of it, and were fortunate in finding it in much better condition than when I had previously gathered it in 1879, and am now able to record it for North Yorkshire. I am at present unaware that it has previously been recorded for this division of Yorkshire. It is given by Dr. Braithwaite in his British Moss Flora for Ingleborough, Yorkshire, found there by the late John Nowell in 1857, and that, I believe, is the only Yorkshire record until this one near Bowes. It is known only from a few localities in Scotland, and Ben Bulbin in Ireland, and consequently is a rare moss in the British Islands.

Naturalist,

Moss.—*Leersia rhabdocarpa* (Schwægr.) Lindb. = *Encalypta rhabdocarpa* Schwægr., in a stone quarry near Bowes, August 1879, and again in August 1903 in fruit.

HEPATICS, gathered August 1903, in Greta Dale.—*Frullania dilatata* (L.) Dum., generally distributed on trees, often near dwellings, in orchards, etc.; *Porella rivularis* (Nees.) Lindb., bank of the Greta, rare; *Scapania undulata* (L.) Dum.; *Scapania umbrosa* (Schräd.) Dum., not a common plant; *Jungeomania riparia* Taylor; *Jungeomania turbinata* Raddi., plentiful on stones by the Greta; *Lophocolea bidentata* (L.) Dum.; *Marsipella emarginata* (Ehrh.) Dum., a widely distributed hepatic.

(APPENDIX F.)

FUNGI OF BOWES.

THOMAS GIBBS.

On the Bowes excursion the Yorkshire Mycological Committee was represented by Messrs. Uriah Bairstow and J. Williams Sutcliffe, Halifax, and the writer. The Secretary, Mr. C. Crossland, F.L.S., was unfortunately unable to be present, but rendered valuable assistance as referee, all specimens about which there was any doubt being submitted to him to report on. Mr. R. H. Philip, of Hull, also contributed notes of *Uredineæ* observed, and other members of the party assisted as collectors. The routes followed were two, the first above Bowes, through the rocky gorge of the Sleightholme Beck; the other by the banks of the Greta below Bowes, past Rutherford Bridge, and ending in the dense woodlands of Brignall Banks. Both routes proved fairly productive, nearly eighty species being observed. Although too early in the year to expect much from the fields and open ground, a pasture on the beck side below the Sleightholme gorge yielded several interesting Agarics, prominent among these being the pink-spored genera *Entoloma*, *Leptonia*, and *Nolania*. Another feature of the excursion was the number of species of *Myxomycetes* noticed, these including *Clathroptychium rugulosum* Rost (= *Dictydium plumbeum* of Lister's Monograph), a somewhat uncommon species of great morphological interest. On Brignall Banks a rotting branch was seen clothed with miniature forests of *Ceratiomyxa mucida* Schrœt., its delicate glassy or coral-like branches forming a lovely object under a pocket lens. The most interesting Agaric seen was the edible *Lactarius deliciosus* Fr., easily recognised by its deep orange milk, which soon turns

green on exposure to the air. Its appearance would scarcely lead a novice in fungus eating to experiment upon it, nevertheless it is said to be one of the most delicious of edible fungi. The Discomycetes noticed were few, and included only common species.

In the following list of the species observed the localities are indicated by initials, as follows:—B = Brignall Banks, S = Sleightholme Beck, and G = banks of Greta between Bowes and Rutherford Bridge:—

GASTROMYCETÆ.

Lycoperdon bovista L.

L. gemmatum Batsch.

In pastures.

HYMENOMYCETÆ.

Amanitopsis vaginata Roze.

Woods, B.

Laccaria laccata B. & Br.

Woods, S.

Collybia velutipes Curt.

On dead wood, B.

C. dryophila Bull.

Among dead leaves, S.

Mycena rugosa Fr.

On dead branch, B.

M. galericulata Scop.

M. speirea Fr.

M. acicula Schæff.

M. sanguinolenta A. & S.

All among dead leaves and branches, G. and B.

Pluteus cervinus Schæff.

On dead wood, B.

Entoloma jubatum Fr.

E. griseo-cyaneum.

E. sericeum Bull.

All in pasture, S.

Leptonia lamprospora Fr.

In pasture, S.

Nolania pascua Pers.

Pastures and woods.

Naucoria melinoides.

In pastures, S.

N. pediades Fr. B.

Galera tenera Schæff.

In pastures, S.

G. hypnorum Batsch.

Among moss, B. and S.

Crepidotus mollis Schæff.

On dead wood, B. and S.

Cortinarius (Telamonia) incisus Fr.

In wood, S.

Agaricus arvensis Schæff.

In wood, S.

A. campestris L.

Stropharia stercorearia Fr.

S. semiglobata Batsch.

Both on dung in fields.

Hypholoma velutinum Pers.

In pasture.

Panæolus phalænarum Fr.

P. campanulatus L.

Both in pastures.

Anellaria separata L.

On dung in pastures.

Psilocybe cœnecii Pers.

In pastures.

Coprinus comatus Fr.

In pasture.

C. micaceus Fr.

On stump, B.

Hygrophorus chlorophanus Fr.

Among grass B.

H. psittacinus Schæff.

H. conicus Scop.

In pastures.

Lactarius subdulcis Bull.

L. deliciosus Fr.

Marasmius androsaceus L.

All under firs, B.

Boletus flavus With.

Among grass in wood, B.

B. chrysenteron Fr.

Polyporus squamosus Fr.

On a stump, G.

P. betulinus Fr.

On birch trunk, B.

P. hispidus Fr.

Fine specimens on ash trunk, Kilmond's Scar.

Poria vaporaria Fr.

P. medulla-panis Fr.

P. sanguinolenta A. & S.

Odontia fimbriata Pers.

All on dead branches.

Clavaria cinerea Bull.

On the ground, B.

Dacryomyces stillatus Nees.

On decorticated wood.

UREDINACEÆ.

Uromyces alchemillæ Pers.

On *Alchemilla vulgaris* near
Bowes.

Puccinia taraxaci Plow.

On dandelion.

P. menthæ Pers.

On *mentha* near Bowes.

P. poarum Niels.

Æcidium on *Tussilago*.

Melampsora betulina.

On birch.

M. farinosa Schræt.

On willow.

PYRENOMYCETÆ.

Leptosphaeria acuta Mont. & Nestl.

On dead nettle stems.

Lasiosphaeria ovina Pers.

On dead branch, B.

Xylaria hypoxylon L.

On dead wood.

DISCOMYCETÆ.

Humaria granulata Sacc.

On cow dung.

Lachnea scutellata L.

On stick in wet place, S.

Helotium cyathoides Bull.

On herbaceous stems.

Mollisia cinerea Batsch.

On dead wood, abundant.

Dasyscypha virginea Batsch.

Frequent on dead wood.

D. acutipila B. & Br.

On dead *Juncus*, S.

D. hyalina Pers.

PHYCOMYCETÆ.

Pilobolus kleinii Van Tiegh.

On sheep dung collected near
Bowes.

MYXOMYCETÆ.

Physarum nutans Pers.

On dead wood, G.

Fuligo varians Somm.

On the ground, S.

Leocarpus fragilis Rost.

On dead wood, B.

Stemonites Friesiana De Bary.

On dead wood, S.

Clathroptychium rugulosum Rost.

On dead branch, B.

Trichia fallax Pers.

On dead wood, S.

Arcyria nutans Grev.

A. incarnata Pers.

On dead wood, B.

Ceratiomyxa mucida Schræt.

On rotten wood, B. ; on soil, S.

(APPENDIX G.)

DIATOMS AT BOWES.

R. H. PHILIP.

The gathering of Diatoms made on this occasion included no special rarities, but only those species usually found in moorland districts. The most remarkable thing about them was the great difference between the Diatomaceous flora of the two streams examined—Deepdale Beck and Sleightholme Beck. Both these rise in similar moorland country and flow through similar geological strata, yet the diatoms found in them are almost entirely different. In Deepdale Beck *Cocconeis pediculus* (unusually fine), *Rhoicosphenia curvata*, and *Synedra pulchella* are the predominant forms. The last two of these species were not

found at all in Sleightholme Beck, and the first was only represented by a few small-sized specimens. On the other hand, the principal forms in Sleightholme Beck were *Diatoma hyemale*, *Amphora ovalis*, and *Amphipleura pellucida*, none of which were found at all in Deepdale. Of 37 species recorded for Deepdale and 24 for Sleightholme, 13 only were common to the two streams, and, with the exception of the ubiquitous *Navicula radiosa* and *Encyonema ventricosum*, none of these were very abundant in either. The explanation of this curious divergence is to seek, and is not very obvious. A complete list follows :—

Deepdale Beck :—

<i>Achnanthes linearis</i> .	<i>Nitzschia linearis</i> .
<i>Cymbella affinis</i> .	<i>N. vitrea</i> forma major.
<i>C. obtusa</i> .	<i>Pinnularia mesolepta</i> .
<i>Denticula tenuis</i> .	<i>Pleurosigma Spencerii</i> .
<i>Diatoma elongatum</i> var. <i>tenue</i> .	<i>Rhoicosphenia curvata</i> .
<i>Encyonema gracile</i> .	<i>Surirella ovalis</i> vars. <i>Crumena</i>
<i>E. turgidum</i> .	and <i>minuta</i> .
<i>E. cæspitosum</i> .	<i>Stauroneis anceps</i> .
<i>Eunotia lunaris</i> .	<i>Synedra radians</i> .
<i>Gomphonema acuminatum</i> .	<i>S. pulchella</i> .
<i>G. montanum</i> .	<i>Tabellaria flocculosa</i> .
<i>G. parvulum</i> .	<i>Vanheurckia vulgaris</i> .
<i>Nitzschia commutata</i> .	

Sleightholme Beck :—

<i>Amphipleura pellucida</i> .	<i>Epithemia turgida</i> .
<i>Amphora ovalis</i> .	<i>Eunotia pectinalis</i> .
<i>Cymatopleura elliptica</i> .	<i>Navicula elliptica</i> .
<i>C. Solea</i> .	<i>Pinnularia sublinearis</i> .
<i>Diatoma hyemale</i> .	<i>P. viridis</i> .
<i>Epithemia sorex</i> .	

Common to the two streams : —

<i>Cocconeis pediculus</i> .	<i>Eunotia arcus</i> .
<i>C. placentula</i> .	<i>Gomphonema constrictum</i> .
<i>Cymbella affinis</i> .	<i>Meridion circulare</i> .
<i>C. cistula</i> .	<i>Navicula radiosa</i> .
<i>C. cymbiformis</i> .	<i>Synedra ulna</i> and vars. <i>lan-</i>
<i>Encyonema ventricosum</i> .	ceolata, longissima, and
<i>Epithemia gibba</i> .	<i>splendens</i> .
<i>E. zebra</i> .	

In tank at end of Bowes village, near the house said to be the prototype of Dickens' Dotheboys Hall :—

<i>Fragilaria virescens</i> .	<i>Synedra Vaucheriae</i> .
<i>F. capucina</i> .	<i>Tabellaria fenestrata</i> .
<i>Synedra ulna</i> var. <i>obtusa</i> .	

And a few others previously recorded in the becks.



U. J. Boston.

Dot-holes in 'The Trough,' Sleightholme Beck, Bowes.

Dr. J. L. J.

REVIEWS AND BOOK NOTICES.

Geographical Distribution of Vegetation in Yorkshire, Part 2, by **Dr. W. G. Smith** and **W. M. Rankin, B.Sc.** 'The Geographical Journal,' August 1903, pp. 141 to 178, with a coloured Map and several Photographs.

This second part of the survey of Yorkshire includes the district from Wetherby and Thorp Arch northward to Malham and the head of the dales of the Wharfe and the Nidd. It rises to a height of 2,300 feet in Great Whernside (which must not be confounded with the better-known Whernside at the head of



Gordale Scar.

the Ribble) and includes some of the best-known botanical stations in the county, such as Malham Tarn, Malham and Gordale Scars, Arncliffe Clouder, Bolton Woods, and the banks of the Wharfe at Thorp Arch. There is a great deal of limestone rock, Carboniferous and Permian, so that the flora is larger and more varied than in the tract included in the first map. The text includes seven photographs of characteristic stations, and it is prefaced by a short account of the geology of the district by Mr. P. F. Kendall, of the Yorkshire College. The rocks range from the Trias downward to the Silurian, but the last is only very slightly represented. According to a

pamphlet issued by Messrs. Henry Richardson & Co., of York, the annual rainfall ranges from 24 inches at York to 61 inches at Arncliffe, in Littondale. The eastern half of the tract is made up of low-lying cultivated ground, with a few woods interspersed. The upper limit of wheat cultivation is at 600-700 feet, and of cultivation other than wheat, at 1,000-1,100 feet. The western half of the district includes a good deal of woodland and moorland. About Malham Tarn, at an elevation of 1,300 feet over limestone, Mr. Morrison planted a million trees, of which only about fifty thousand have survived. The situation is unsuitable for larch and Scotch fir, the trees which succeeded best being sycamore, beech, birch, alder, thorn, wych elm, and mountain ash. As in the previous paper, a list is given under



Limestone Scars and Scar Wood at Kettlewell.

each kind of locality of its characteristic plants. This district affords, which the first did not, an excellent opportunity of estimating the change in the vegetation caused by the presence of limestone rock. As I said before these maps, with the accompanying texts, represent a large amount of conscientious hard work, and should be carefully studied by all who take an interest in plant distribution. It is much to be hoped that the committee appointed by the Yorkshire naturalists may be able to extend the survey to other parts of the county. It is very gratifying to find that arrangements have been made by which separate copies of the maps, with accompanying papers, can be easily procured at a moderate price, and that these

Naturalist,

have been awarded the Back Bequest for 1903 by the Royal Geographical Society. I am afraid that a large proportion of the botanists of the country do not see the Journal of the Royal Geographical Society. My own contributions to the knowledge of Yorkshire plant-distribution are dated here 1885. This is the date of the second edition of my 'North Yorkshire,' issued in the Transactions of the Yorkshire Naturalists' Union, but this does not differ, except in additional details, from the first edition, which was published in 1863. We are indebted to the Secretary of the Royal Geographical Society for permission to reproduce two of the photographs.

J. G. BAKER.

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Natural History Record Books. By Rev. W. J. Wingate. Bishop Auckland. 6d.

The Secretary of the Durham Naturalists' Union has, in preparing this Record Book, distinctly made a forward step in the direction of the county surveys proposed in the January number of 'The Naturalist.' The author issues it as an experiment, but we venture to think that the general plan of the Record Book has come to stay, although minor details may require to be modified as experience is gained. It may be described as a composite note-book consisting of a booklet of instructions and five note-books. The instructions are precise and clearly set forth the method of using them, and are intended to be used for observations in five sections of Natural History. The six booklets pack into one cover, and the whole is by no means bulky, so that several Record Books may easily be stowed into one's pockets. The method of recording is applicable to any branch of natural history, and greatly simplifies the work of recording observations. The whole idea is so excellent and suggestive, that we heartily recommend Naturalists to see for themselves by procuring a copy from the author, who issues the book at a price which must barely cover the cost of printing, paper, and preparation.

W. G. S.

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 ZOOLOGICAL SYNONYMY.

Index Animalium | sive | index nominum quae ab A.D. MDCCCLVIII | generibus et speciebus animalium | imposita sunt | societatibus eruditorum adjuvantibus | a | **Carolo Davies Sherborn** | confectus | **Sectio Prima** | a kalendis ianuariis, MDCCCLVIII | usque ad finem decembris, MDCCC | Cantabrigiae | e typographio academico | M DCCC II |

[Large 8vo., lx + 1195 pages, cloth.]

It is impossible to over-estimate the value of works of this class to real scientific investigators, and the sincerest thanks of all such are due to the learned societies—the British Association, the Royal and the Zoological Societies—whose financial aid has made its production feasible, and to

Mr. C. D. Sherborn, the compiler, for the care, the accuracy, and the precision with which he has carried out a work which has occupied him eight years.

The enormous mass and extent to which scientific literature has attained in these latter days is well exemplified by the fact that this portly volume of over 1,200 pages only deals with the names which have been applied to the various forms, species and genera of animals only for the 42 years extending from 1758, the date of the tenth edition of the *Systema Naturæ* of Linnæus, to 1800, and that there are about 61,600 entries. The formidable task remains of dealing with the literature of 1801 to 1903, and although the actual crop of names to be garnered from it may not be equal proportionally, the area of investigation—i.e., the literature to be examined—is tremendously larger than that of the period dealt with in this first instalment.

The object of the work is to save the time of systematic zoologists and to obviate the danger of making needless synonymy by furnishing a full list of all the names which have been conferred upon animals, and giving the exact date of each name, together with a reference to the place where described which shall be intelligible to the zoologist and the layman alike. This has been so well accomplished that the work is a model of simplicity and lucidity, and so far as we have been able to test it the entries are not merely correct, but give all the information needed, and no more than is necessary.

We are pleased to note that the plan adopted by botanists in the 'Index Kewensis,' a similar work, of arranging under genera, has not been followed, the present work having its entries arranged under species, in harmony with the zoological view that the species is the real and true entity as regards questions of nomenclature.

One incidental benefit to British science conferred by this work is that the British scientific libraries have been strengthened by the acquisition of much literature which, when the preparation of the manuscript commenced, was not to be found in England.

In concluding this notice, we wish to emphasise the importance of dictionary works of this class—and to urge upon all who wish to further the advancement of science the desirability of adding to their own libraries, or to those of public institutions in which they take interest, works of the character of the 'Index Animalium,' and to wish Mr. Sherborn—and his sister—health and strength to complete so great and splendid a monument of industry, skill, and acumen.



Insect Folk. Margaret W. Morley. Ginn & Co., London. 204 pp. 2s.

Ways of the Six Footed. Anna B. Comstock. Ginn & Co., London. 152 pp. 2s.

The first of these attractive-looking books is prepared for children and is written in simple language. It is profusely illustrated, and cannot but be of interest to young readers. The chapters are headed:—'Our Pretty Dragon Flies,' 'The Grasshopper Tribes,' etc. Under 'The Great Bug Family' we have 'A Bad Bug [sketch]'. Now, here is a bug we all loathe. It is round and flat, and reddish-brown in color, and it has a disgusting odor. But, though we hate this bug, it is very fond of us'!

'Ways of the Six Footed' appeals to a little more advanced students, and is even better illustrated, some of the pictures of insects and landscapes being charming. Ants, bees, wasps, grasshoppers, etc., etc., are dealt with in a very attractive manner. Both can be recommended as gift books to young naturalists, though several of the illustrations, words, and methods of spelling will be unfamiliar to English readers.



'Additional Notes on the Roos Carr Images' is the title of Hull Museum Publication No. 14, May 1903. 1d.

The Keighley Corporation Museum has just issued a penny 'Guide No. 1,' presumably the first of a series. It deals with the British birds and, though not signed, is evidently the work of the Curator, Mr. S. L. Mosley. It contains eight closely printed pages, and is illustrated. We learn that to the ordinary visitor to the seaside

‘A Sea-gull flying o’er the deep,
Or perched upon the shore,
A simple ‘Sea-gull’ is to them,
And it is nothing more.’



‘The Annual Report of the Yorkshire Philosophical Society for 1902’ has just been issued. Mr. H. J. Wilkinson gives Part 9 of the ‘Catalogue of Plants’ in the Society’s herbarium, which includes several northern county records. Notes on meteorology, recent excavations, and additions to the museum are also included.



A portion of a skull and horn cores of *Bos primigenius*, in very good state of preservation, has recently been found at New Holland, at a depth of 20 feet. Along the outside of the horns from tip to tip the measurement is five feet. The accompanying sketch of the horns is taken from the fifth



Horn Cores of *Bos primigenius*.

Quarterly Record of additions to the Hull Museum (Publication No. 15) just issued. The same publication contains an account of a mammoth tusk found at Brough, and various items of antiquarian interest. It is also stated that about eighty vases of local wild flowers, gathered fresh, are on exhibition in the Museum.



Mosses with hand-lens and microscope, a non-technical hand-book of the more Common Mosses of the North-eastern United States. Part I., by A. J. Grant, Ph.D., New York, 1903, price \$1, has just been issued. It is an admirable 4to production of 86 pages, with several excellent plates and numerous illustrations in the text.



The Report of the Manchester Museum, Owens College, for the year 1902-3 has just been issued. It contains particulars of the extensive work accomplished during the year at the Museum, with a list of donations, etc.



Professor Boyd Dawkins’ paper on the Derbyshire Bone Cave (see ‘The Naturalist,’ July, pp. 226-7) has been reprinted as Notes from the Manchester Museum, No. 16.

FIELD NOTES.

MAMMALS.

White Leveret near Bardney, Lincolnshire.—A white Leveret is now to be seen in the parish of Goutby, near Bardney. These white specimens have appeared from time to time in this neighbourhood for more than 50 years. So far as is known they first appeared in the parishes of Langton and Woodhall, and seven years ago I presented a mother and two young, which had been killed in Langton, to the Lincoln Natural History Museum, stuffed by Mr. A. Fieldsend, of Lincoln. They have of late years considerably extended their range; but it is still only now and then that they recur.—J. CONWAY WALTER, Horncastle, 16th July 1903.

BIRDS.

White Herons in Lincolnshire in 1772.—Dugdale's 'Imbanking and Draining' (1772), p. 218, says: 'Dowsdale holt where many *white* Herons do breed.' The locality is just in Lincolnshire, but the holt and white Herons have gone for ever.—E. A. W. PEACOCK, Cadney.

Pied Wagtail's Nest.—A Song Thrush built a nest in a pear tree trained to a wall in my garden. When it was completed, and before any eggs were laid, the gardener working about it caused the Thrush to forsake its nest. A Pied Wagtail then took possession and built its nest inside the forsaken Thrush's nest and brought off her brood.—RICHD. PAVER-CROW, Boroughbridge, 14th August 1903.

ENTOMOLOGY.

Entomology at Little Bytham, Lincolnshire.—On 9th June, when the Lincolnshire Naturalists visited Little Bytham, the wet, cool weather was adverse to entomological work. The following insects noted are, perhaps, worthy of mention:—Amongst the lepidoptera, *Adela degeerella* L., a lovely 'Long-horn' moth; *Melanthia albicillata* L. and *Bapta temerata* Hb., two of our most beautiful 'carpets.' Along with these some common 'waves' and tortrices. The coleoptera furnished nothing of importance, but a rather large colony of the pretty steel-blue carabid beetle, *Leistus fulvibarbis* Dej., which was found under the bark of a dead tree; also in a large boletus occurred many of the common fungus beetles, *Epurea deleta* Er.; *Dacne rufifrons*

F. and small *Homalotæ*. A few common Saw-flies, *Tenthredo punctulata*, *mesomelæna*, *livida*, etc., completed the day's captures. The maple leaves were much and prettily galled with *Eriophyes* (*Phytoptus*) *macrorhynchus* Nal., and fungus attack on various plants was very perceptible everywhere.—ALFRED THORNLEY, South Leverton, Lincoln.

Galls at Careby, Lincolnshire (Div. 16).—At the meeting of the Lincolnshire Naturalists' Union at Careby, on 9th June 1903, the following were noted :—

- Andricus curvator* Htg., on *Quercus robur* L.
- Cecidomyia Ulmarie* Bremi., on *Spiræa Ulmaria* L.
- Eriophyes goniothorax* Nal., on *Cratægus monogyna* Jacq.
- Eriophyes avellanæ*, on *Corylus Avellana* L.
- Eriophyes macrochelus* Nal., on *Acer campestre* L.
- Eriophyes macrorhynchus* Nal., on *Acer campestre* L.
- Eriophyes galii* Karp., on *Galium verum* L.
- Phyllocoptes fraxini* Nal., on *Fraxinus excelsior* L.
- Phyllocoptes Thymi* Nal., on *Thymus Serpyllum* Fr.
- Rhodites rosæ* Htg., on *Rosa canina* L.
- Xestophanes potentillæ* Cam., on *Potentilla reptans*.

Galled specimens of the following were taken :—

- Euonymus europæus* L., leaves.
- Hieracium Pilosella* L., flower stalk.

which as yet remain unnamed.—S. C. STOW, Grantham.

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FLOWERING PLANTS.

Abnormal Figwort in Spen Valley.—During the past week I found on the banks of the Spen at Smithies, Heckmondwike, an abnormal specimen of Figwort (*Scrophularia nodosa* L.) growing near normal plants of this species. Instead of having the usual square stem and decussate leaves, this plant has a six-sided stem and a whorl of three leaves at each node. The leaves of a whorl spring from alternate faces, and alternate with each other at succeeding nodes from the base of the stem upwards. This arrangement is continued to the inflorescence, a branch arising in the axil of each of the three bracts of a whorl. The specimen has been placed under the care of Mr. J. Ackroyd, recorder of the Heckmondwike Naturalists' Society.—T. CASTLE, Heckmondwike, 6th July 1903.

***Galium Mollugo* near Grimsby.**—This plant does not appear to have been recorded for this vice county (Lincolnshire N.) many times, and not at all in the Grimsby area. I found several plants during July in Old Clee village.—ARTHUR SMITH, Grimsby.

NORTHERN NEWS.

Mr. C. Crossland gives the total number of fungi collected in the Parish of Halifax as 1,105.

Mr. J. E. Crowther contributes a list of the 'Mollusca of the Parish of Halifax' to the 'Halifax Naturalist' for August.

Mr. J. W. Farrah contributes 'A Real Holiday' (an account of a geological excursion to Horton-in-Ribblesdale) to 'Westward Ho' for July.

The August 'Zoologist' records a Grasshopper-Warbler, Tree Sparrow, Stockdove, and Water-Rail in the Isle of Man, and the Honey-Buzzard in Cheshire.

A complaint has been made of the destruction of bird-life in Luddenden Dean, near Halifax. We trust the local naturalists will take the matter up and prevent cause for further notice of the matter.

The Technical Instruction Committee of Leeds will support the application of the Yorkshire College for the establishment of a University of Yorkshire, and will also contribute to its funds in the event of a Charter being granted.

The University of Birmingham has received a gift of the collection of shells made by the late Dr. F. Archer, of Liverpool, and his son, the late Col. Archer. Mr. J. R. B. Tomlin, of Chester, has secured the J. T. Marshall collection of British shells.

From the Pendleside series of Hodder Place, Stonyhurst (Lancashire), a new species of *Solenopsis* [*Solenomorpha*] has been found. It is described by Dr. Wheelton Hind in the August 'Quarterly Journal of the Geological Society' as *Solenomorpha major*.

Mr. E. L. Gill has demonstrated the occurrence of Keisley Limestone-pebbles in the Red Sandstone-rocks of the Isle of Man (Q.J.G.S., August 1903). He also gives a list of fossils observed in these pebbles, which not only all belong to the species found in the Keisley Limestone, but they form a group which would be a characteristic small selection from that horizon.

'The Marl-Slate and Yellow Sands of Northumberland and Durham' is the title of a paper by Professor G. A. Lebour in the 'Transactions of the Institution of Mining Engineers' just issued. The author points out the difference between the Permians of North-east England and those of the Midlands, and still greater differences in the Permians of Westmorland and Cumberland.

We regret to record the death of Mr. R. G. Clayton, of Middlesbrough, which took place suddenly on 27th June. The eldest son of Mr. John Clayton, now of Stokesley, he was born at Middlesbrough, where he was well known and much respected. He took an active part in the affairs of the town, especially in connection with the Free Library, Museum, and the Literary and Philosophical Society. He was a member of the Yorkshire Naturalists' Union, and has been for many years a most useful and active member of the Cleveland Naturalists' Field Club. He was well known as a keen observer of everything appertaining to mammals and birds, and contributed to 'The Naturalist' and the Proceedings of the Cleveland Naturalists' Club.

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NOTES AND COMMENTS.

EARLY BURIALS.

The barrows, or burial mounds, of East Yorkshire, have long been famous for their interesting contents, and from the evidence they afford of the manners and customs of the early inhabitants

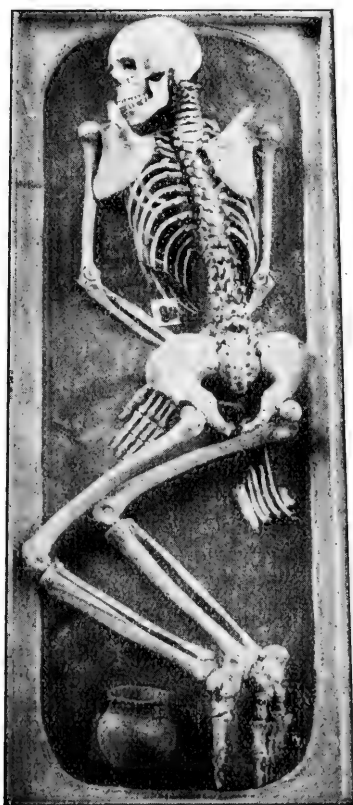


British Interment from a Barrow at Garton Slack.

of the district. In the Mortimer Museum at Driffeld are two exhibits of exceptional interest and importance, from the fact that they are precisely in the positions in which they were found. The first is a British burial (female) from a barrow at Garton Slack. Behind the skull is a bone hair-pin; a flint scraper occurs near the teeth, and two flint implements exist in place of some of the bones of the left foot, which had obviously been severed at the instep some time before burial. The curious crouched position of the interment is admirably shown in the photograph.

AN ANGLO-SAXON INTERMENT.

In Anglo-Saxon times the interments were of a very different



Anglo-Saxon Interment.

description. Instead of the objects accompanying the interments being of stone and bone, and occasionally bronze, it is found that they consist of a large proportion of iron implements. The second figure is of a skeleton from an Anglo-Saxon cemetery near Garton Slack, on the Wolds, and it will be seen that the method of interment is of a totally different character. The body in this instance was interred on its chest, with the head twisted round to the left. At the waist is an iron knife, which had evidently been inserted in a belt, the iron buckle of which remains. Near the pelvis are some animal bones, evidently the remains of food placed with the interment, and at the feet is a plain globular food vase. The two illustrations

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forthcoming work 'Forty Years' Researches in British and Anglo-Saxon Burial Mounds of East Yorkshire,' and have been kindly lent by the publishers, Messrs. A. Brown & Sons.

BOTANICAL SURVEY AT THE BRITISH ASSOCIATION.

Yorkshire naturalists were 'well in it' at Southport. Representatives from Bradford, Malton, Selby, Leeds, Huddersfield, and Halifax were rarely absent from Section K, and they sat through discussions with no end, papers of varying merit, and 'semi-popular lectures.' The veterans were in the mood to enjoy a well-earned leisure, but the younger members had to be in the fray, and, as might be expected, their topics had all a bearing on some aspect of botanical survey.

Mr. Rankin (Leeds), in response to a request, brought the subject of County Botanical Surveys before the Delegates' Conference on the first day. An hour of the President (Sir N. Lockyer) had rather taken the edge off the zest for botanical matters. It was well that the reader was brief and to the point. We hear that the paper is to be published and circulated for consideration in quieter moments. At Tuesday's meeting the delegates were again reminded of botanical survey, as it was one of the subjects recommended for local societies in the scheme submitted by Section E (Geography).

On Friday afternoon ecological subjects were down for Section K, but none from Yorkshire. An interesting paper was given by Miss M. C. Stopes, who had observed the drying up of a small tributary of the Thames, and during two years watched the aquatic plants being replaced by land plants. The same afternoon some of the Yorkshire representatives had a word to say in connection with a paper read at Section E on the Afforestation of the Waterworks' Gathering Grounds of Liverpool. What has been done at Lake Vyrnwy can be done in all our Yorkshire valleys, and we should then have profitable woodland instead of moors of low value. At another meeting a paper on the sand-dune vegetation near Southport, by a Manchester botanist, was nearly wrecked by an ardent local botanist telling how the marram grass and the trees were regularly planted by the land-owners.

Tuesday was a busy day with Botanical Survey. Four papers on it were read at Section E (Geography) and one at Section K (Botany), while in the afternoon a large party examined for themselves the sandhill plants between Southport

and seaside. At Section E, Mr. C. E. Moss gave a very clear summary of his investigations into the age and origin of the peat moors of the Southern Pennines. As the evidence of one who really knows these peat-mosses the paper is a valuable one, and it is good to hear that arrangements are being made for its publication. When it appears there will be material both for reflection and discussion. A first instalment of 'A Botanical Survey of the Basins of the Rivers Eden, Tees, Tyne, and Wear' by Mr. F. J. Lewis (Liverpool) was read in his absence. This paper (and map) is to appear later in the same series as the recently published papers on Geographical Distribution of Vegetation in Yorkshire, and will be an important part of a contemplated survey of the Pennines from Derbyshire to the Cheviots. The vegetation of the moors of Westmorland presents some striking difference from that of the West Riding. An important addition is the *Sphagnum* bog which occurs on large areas north of Hawes. The discovery of Scots Pine buried in the peat at about 2,000 feet gives a new aspect to the distribution of this tree in the uplands of Northern England. The other papers in Section E were suggestions brought forward by Dr. Darbishire (Manchester) and Dr. W. G. Smith (Leeds), that travellers and explorers outside of Britain might give fuller reports on the plant-life seen by them; the botanical survey work in Britain was referred to as a guide in the preparation of maps and notes. The geographers seemed well pleased with their sitting.

On visiting the section for Botany, Mr. Woodhead was found to be explaining 'Methods of Mapping Plant Distribution,' an outcome of work in the Huddersfield district, on the six-inch and twenty-five inch scale. By means of maps and lantern slides it was shown how closely linked the undergrowth of a wood is to the trees overhead, and how changes in the trees are closely followed by the ground-plants. There were also fleeting glimpses of good work done, such as the working out of the structure of the Bracken on the hillside, as compared with the Bracken in the open Oak wood and in more deeply shaded woods. Some careful observation on the life-history of the Blue-bell seems also to be going on round Huddersfield. But the section was jaded after a morning amongst fossils and life-history, the lunch hour was diminishing, and the sandhills excursion set off at 2 p.m. In the President's own words, however, the local survey work had come in 'like a breath of fresh air,' and the section evidently thought the fresh air was not unwelcome.

NOTES ON THE VEGETATION OF PONDS.

WILLIAM G. SMITH, B.Sc., Ph.D.,

Yorkshire College, Leeds.

THE vegetation of a number of small ponds near Filey was a feature of the botanical excursion at the Y.N.U. meeting on Whit-Monday last. Almost the first pond met with was resplendent with a mass of Bog-bean in flower, and, as one after another pond was visited, it became evident that each had features peculiar to itself and was quite distinct from any of its neighbours. This we have endeavoured to show by means of the three diagrams reproduced. They are prepared from free-hand sketches of three distinct ponds, and the arrangement of the vegetation is given as nearly as possible. The diagrams and notes are given here, not as a complete study, but as the result of a single day's excursion. Yet they show points of distinct interest in the distribution of plants, and will have served their purpose if they only show what an excellent opportunity for local survey lies to the hand of those who can make continued observations on these or similar ponds.

The ponds are situated on uncultivated land about two miles south of Filey, and are all within a quarter of a mile from the edge of the boulder clay cliffs. The land surface is irregular and made up of a series of knolls and ridges, with hollows or troughs between, which lie approximately parallel to the cliff edge. In many of these troughs ponds of various sizes have formed. The three shown in the diagrams are about the same size, roughly about sixty yards long, and like most of their neighbours they are long oval in shape. Their features are best dealt with by taking them one after another.

FIG. 1.—This may be distinguished as the Bog-bean pond from the great abundance of *Menyanthes trifoliata*. It is an example of the pond with open water, a few of which were seen, and one in particular had only a narrow belt of marginal plants. The Bog-bean pond occupies a hollow near the cliff edge, from which it is separated by a single ridge only, so that it may soon share the fate of an adjacent pond, the outer containing ridge of which has already gone over the cliff. An outflow channel is shown at the southern end, but this lies so high that it can only serve as an overflow channel when the pond becomes full of water. When the water begins to escape by this overflow-outflow the pond will have reached its maximum depth, as was

the case when we saw it. The muddy bottom did not look tempting for wading, and as an investigation of the ponds was not anticipated, we had no means of determining the exact depth. No inflow channel could be distinguished, the northern end being a uniform grassy slope. The supply of water seems to be maintained by surface drainage, although the clear-water patch suggests springs, but whether these are probable in the

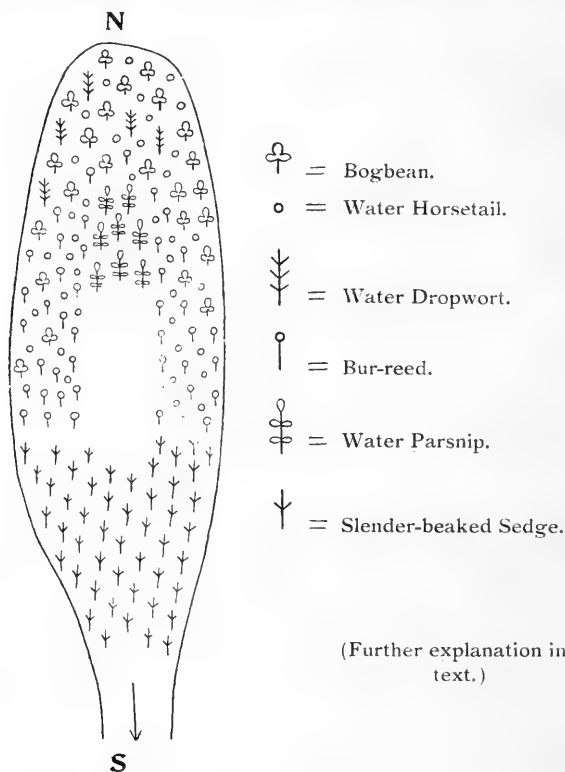


Fig. 1.—The Bog-bean Pond.*

boulder clay we leave to be determined. The vegetation was distributed in an interesting way. Considered generally, it consisted of a mass of Sedge (*Carex ampullacea*) at the southern end, a patch of Water Parsnip (*Sium erectum*) at the northern end of the clear water, and an elongated horse-shoe mass of

* Mr. F. Cavers, B.Sc. (Technical School, Plymouth), kindly assisted in preparing the drawings from which the blocks are reproduced.

Bog-bean (*Menyanthes*), Water Dropwort (*Oenanthe fistulosa*), Water Horsetail (*Equisetum limosum*) and Bur-reed (*Sparganium simplex*). The northern end appeared at first sight to be one mass of Bog-bean, but on closer examination the slender stems of the Horsetail and Dropwort were seen to be fairly abundant. The Bog-bean occurred in the water at this end, and also on the marshy shores; the plants on land were smaller, and the flowers in the water looked so much more tempting that most of us risked wet boots for the rest of the day. Towards the southern end of the pond the Bog-bean became scattered and confined to the margin. The Water Dropwort was almost entirely confined to the northern end. Along both shores Bur-reed was the most abundant plant, but mixed with it were stems of Water Horsetail and a few plants of Bog-bean. Duckweed was present throughout the whole pond. With the exception of this last, all the plants have roots and stems embedded in the muddy bottom, and from these leafing and flowering shoots are sent up annually. Taken all together they form an aquatic association, with at least five sub-associations, viz.: (a) Sedge, (b) Water Parsnip, (c) Bur-reed, (d) Water Horsetail, (e) Water Dropwort and Bog-bean. The last-named three, however, are not well-defined and merge into one another. To explain why these occupy the position they do would require careful investigation. One or two points regarding the life of these pond-plants are, however, fairly evident. The Sedges at the outflow end occupy the area where fine mud will be deposited at the sill of the outflow channel; the water is never more than shallow here, and it is probable that in dry seasons the Sedges are left on wet mud. The Bog-bean is also most abundant near the margin, which in drought will be reduced to marsh. The Bur-reed zone may also become wet marsh. That water does not often disappear from the centre is indicated by the Water Parsnip, which is rarely found except in water. Altogether one might deduce that this pond is not subject to rapid drainage and that it retains water even in drought.

FIG. 2.—This pond was also full of water, but differs from Fig. 1 in that it is completely filled with vegetation. At the southern end an inflow is shown, which was bringing in water when we saw it. From the appearance of the channel, it does not always convey water, and only acts as an overflow to some other pond in the same trough. At the northern end there is an outflow depression, which acts as an overflow channel to this pond. The water is probably derived from surface drainage,

except in rainy seasons, when there will be some inflow at the southern end, and the pond will attain its maximum depth when the water begins to pass through the outflow. The dominant plants differ from those of the Bog-bean pond—there is no Bog-bean nor Water Parsnip, but Pondweed and Water Plantain have a place. The plants are arranged in four well-marked zones, viz. : (a) a marginal zone of taller species of Rushes

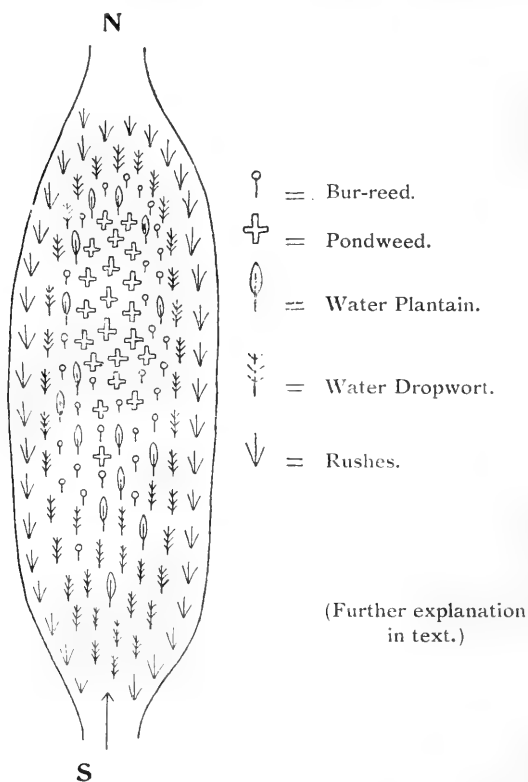


Fig. 2.—The Pondweed and Water Plantain Pond.

(*Juncus*); (b) a zone of Water Dropwort (*Ænanthe fistulosa*), mixed with Water Plantain (*Alisma Plantago*) at the southern end; (c) a zone of Bur-reed (*Sparganium*) also mixed with Water Plantain; (d) a central patch of Pondweed (*Potamogeton natans*). The Pondweed lies in the centre towards the northern end; its leaves were large, and with long leaf-stalks, such as occur in deep water. From this we suspect that the Pondweed

occupies the deepest part of the pond. In consequence of the eccentric position of the Pondweed the zones of Bur-reed and Dropwort are narrow at the northern end, but they are sharply defined. Towards the southern end both plants lose their zonal arrangement, and form masses extending across the pond. The Dropwort, however, is always nearer the shore than the Bur-reed. It may, therefore, be inferred that the Bur-reed prefers deeper water than the Dropwort; this was also the case in Fig. 1. The Water Plantain is an interesting plant in this pond. It does not form masses like the other plants, but occurs singly amongst the Dropwort and the Bur-reed. In other words, the Water Plantain is not a social species, whereas the other plants shown are social. It is a feature of social species of plants that they can grow closely together as a mass, and hold their own more or less completely against all comers. One can appreciate this in the case of the Pondweed, with its broad floating leaves lying edge to edge, or overlapping, so as to occupy the whole surface and shade the bottom, thus checking the growth of other plants which may try to grow below them. Amongst trees, the Beech is one of the best examples of this kind of social plant. The Dropwort, Bur-reed, and Rushes are also social plants, and it is noteworthy that their long, slender, erect leaves are similar in form to the grasses which on land are amongst the most successful of our social plants. Just as the grasses, with their closely interwoven roots and stems underground, and their close, erect, leafy shoots aboveground, can keep in check the growth of other plants and maintain a close sward, so in our pond the Dropwort, Bur-reed, and Rushes maintain themselves in distinct zones with little mixture. The Dropwort is not quite so successful as the other two, and amongst it plants of Water Plantain have found a place and have also succeeded in gaining ground in the closer Bur-reed zone. Turning now to the Rushes on the margin. The Rushes form a close well-marked zone, which at the time of our visit was standing in water and therefore formed part of the pond-vegetation. Out of the water there was, however, no scarcity of Rushes, and from general experience most of us would regard the Rushes as plants of the marsh rather than water-plants. The Rush zone of this pond therefore indicates that part of the margin which is only occasionally under water, and is generally marsh. From this one may infer that this pond, as a rule, contains less water than when we saw it. It has a maximum depth which is determined by the sill of the outflow

channel. The ebb extends at least to the lower margin of the Rush zone, but the Dropwort, Water Plantain, and Bur-reed are all plants which may grow in a wet marsh, and it is probable that this is the drought condition of that part of the pond occupied by these plants. From the appearance of the Pondweed we should say that its area is never quite free from standing water.

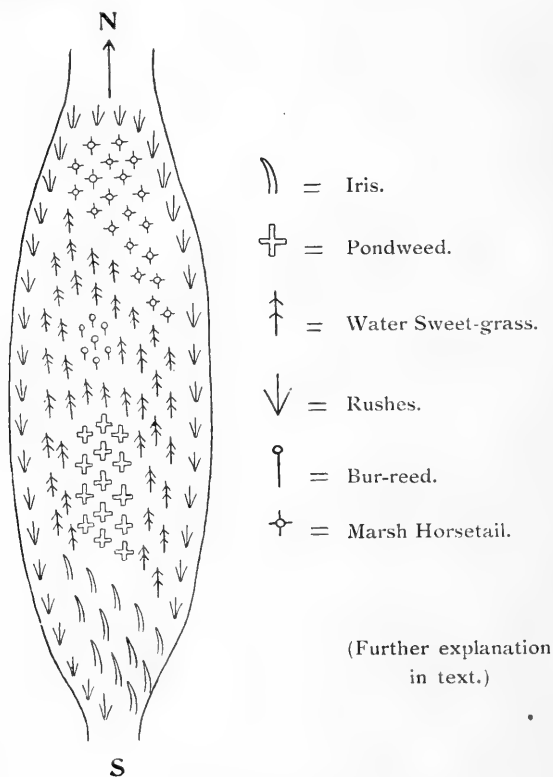


Fig. 3.—A 'dry' Pond.

FIG. 3.—This represents what has been a pond but is now so dry that it might be described as a dry marsh. At the time we saw it (by no means a period of drought) one could walk over any part of it. The shape of the hollow is like that of the true ponds, and there is a distinct outflow channel. There is also an inflow channel of the kind seen in Fig. 2, namely, an occasional channel which drains the overflow from some adjacent hollow.

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For some reason this pond has dried up. Whether this is due to gradual raising of the bottom, or to the deepening of the out-flow so that it drained the pond to the bottom, or to leakage, we cannot say. The vegetation has interesting features. Near the centre are patches of two water-plants—the Pondweed (*Potamogeton*) and Bur-reed (*Sparganium*)—restricted to what are now the wettest spots. The Pondweed has small reddish leaves with short stalks, the Bur-reed has short narrow leaves; unfortunately specimens were not taken for identification. Both are land-adaptations, and are probably the remains of the original aquatic vegetation which has been displaced. The other conspicuous plants of the pond-hollow are: (a) Water Sweet-grass (*Glyceria aquatica*), occupying the centre except the parts utilised by the Pondweed and Bur-reed; (b) *Iris pseudacorus* at the southern or inflow end; (c) Marsh Horsetail (*Equisetum palustre*) at the northern or outflow end; (d) a broad marginal zone of Rushes. The large patch of Water-grass indicates the part of the hollow which is occasionally under water. It is a feature of this grass that it grows well in a moist place liable to inundation. The Iris and Marsh Horsetail occupy well-defined areas, and both are typical marsh plants. Altogether the vegetation of this hollow indicates that it is moist, and even marshy at times, but is never long under water.

Other examples of dry ponds were found. In one extreme case a clump of Rushes in the centre was the last remnant of marsh vegetation, the other plants being intruders from the drier knolls.

The ponds at Filey are thus instructive examples of aquatic and marsh vegetation. The ponds themselves show every stage of transition from ponds of open water to marshy hollows, and even dry hollows. The vegetation includes examples of the chief biological groups of aquatic and marsh plants, which may be summarised as follows:—

- (1) Floating plants, e.g., Duckweeds.
- (2) Plants rooted in mud, with floating or submerged leaves, e.g., Pondweed and Water Parsnip.
- (3) Plants rooted in mud, with leaves which rise above the surface of the water. The most successful social species are those with long erect leaves, e.g., Bur-reed, Iris, Water-grass, Rushes, and Sedges, and with these the two Horsetails may be included. The Water Dropwort is an example of an Umbellifer which, instead of the broad cut-up leaves of that order, has adopted a narrow

type of foliage closely imitating the Horsetails; this is partly a result of its aquatic life, partly an adaptation to meet competition of aquatic plants. The Water Plantain still retains its broad leaves, but these conform so far to the general form of rival species in being much longer than broad and in assuming a more or less erect position; as already pointed out, this plant is not a very successful social species. The trefoil Bog-bean leaf is almost unique amongst water-plants, though not uncommon in marsh-plants.

One feature the plants of these pools have in common: they are all plants which can grow on a muddy bottom; the plants of a stony or shingly bottom are absent. Another common feature of the Filey ponds is that the plants are those which frequent slowly-moving water; the plants of a running stream or quickly-moving pond or lake are absent. The nature of the bottom and the rate of movement of the water have considerable effect in the distribution of water-plants. No attempt has been made here to distinguish between true aquatics and plants of the marsh. These ponds show how difficult this is, because many of the plants are adapted for life in standing water or in wet marsh. Nor have we attempted to deal with the adaptations in internal structure, which are so interesting a feature in water-plants. This rapid glance over the plant-life of ponds has only touched the fringe of the matter, and there is ample material in these ponds and others for a long series of observations, which if carefully carried out would throw light on obscure points in pond-life generally. The East Riding especially is a good field for local botanical work on water-plants.

MAMMALS.

Albino Hedgehog and Mole.—A white Hedgehog, nearly half-grown, was caught at Goathland on the evening of 1st August. It was a true albino, having the characteristic pink eyes. The skin was pink also, and the hair, spines, and nails were pure white. It was not brought to me until 8th August, when it was in a dying condition, and it only lived a few hours after it came into my possession. I had a cream-coloured Mole brought to me on 25th February, which had been caught at Stainton Dale. It was a light cream colour all over, but was slightly marked with orange on the forehead and on the belly.—W. J. CLARKE, F.Z.S., Scarborough.

YORKSHIRE NATURALISTS AT WHARNCLIFFE.

ONE of the few fine days during the 'summer' of 1903 was spent in Wharncliffe Woods, which, notwithstanding their proximity to thickly-populated towns and cities, still retain much of their natural beauty. Over thirty members and associates started from Deepcar Station on the morning of Thursday, 3rd September, but did not get far into the woods (which run parallel with the railway) before first one section and then another was detained in the pursuit of its particular work, until eventually the geologists, who had landed in a very unpromising country, wended their way alone to get a view of the surrounding district from the Crag. Emerging at length in a clearing on the shoulder of one of the Crag, a grand view of the Don Valley was obtained, and from this point the Rev. A. T. Pratt gave a description of the physical features of the neighbourhood. Many fine old Oaks occur in the woods; one example, in front of the Wharncliffe Lodge, was measured by those present, and proved to be sixteen feet in circumference at a distance of a foot above the ground. From its decaying trunk a young Birch tree had sprung, and partially filled the hollow in the Oak by its roots. Members of other sections having gravitated to this point, the services of the keeper were secured, and the party went through the park in quest of the herd of Red Deer belonging to the Earl of Wharncliffe. The deer, however, could not be found, and the search was almost given up when the herd was unexpectedly met with, having been hidden amongst the luxuriant bracken. It was a grand sight—over a hundred of these magnificent animals hurrying away, helter-skelter, through the trees, down the rocky slope, and across the green beyond, until fairly out of reach. Even the photographer, who was perhaps more anxious than any to get 'within range,' was so intent on watching the graceful movements of the herd that his opportunity for a 'near view' slipped by. The keeper, however, made amends, and, calling on 'Diana' (a tame doe), that animal obligingly came at close quarters, and after several unsuccessful attempts at a suitable pose, was snap-shotted.

After tea at the Wharncliffe Lodge, about fifty members attended the meeting, which was held in the open air, under the chairmanship of Mr. W. Denison Roebuck.

After certain formal business had been transacted, the representatives of sections were called upon to give their reports, the

Chairman having explained that it was precisely twenty-five years previously since the Union had visited Wharnccliffe Woods. A report of that excursion, written by Mr. Roebuck, appears in 'The Naturalist' for October 1878 (pp. 46-48).

Mr. A. White reported for Vertebrate Zoology, and made particular mention of the herd of Red Deer which the members had been privileged to see.

For the Conchological Section the Rev. E. P. Blackburn reports:—On leaving the rest of the party the conchologists worked downwards to the river, making a very careful examination of all kinds of likely and unlikely places to find mollusca. After crossing the railway in the wood beyond we found amongst dead wood some *Hyaliniae*, which we took to be *Hyalinia pura*, but these, on subsequent investigation, proved to be immature specimens of *Hyalinia* that were too immature to identify. As we found one specimen of *Hyalinia alliaria* at the same spot they would doubtless be of that species. When we reached the river we found it in flood, and so were not able to make any investigation. Stranded above water mark was one dead specimen of *Limnaea peregra*, very oxidised, which had evidently been washed down the stream. We found also in the wood on the way down *Arion ater* var. *brunnea*. It was a fine specimen and of unusual colouring. Near Wharnccliffe Lodge we investigated various ponds, which, except a small one near the house, used by the cattle for drinking purposes, yielded no results. Out of this we secured a good number of *Pisidium pusillum*. Mr. Bayford, in seeking for insects, secured a *Hyalinia excavata*, one of the rarer kinds, which was in good condition, and was much greener in shade than usual. An *Arion ater* was also reported at Deepcar Station, but was not verified by us. These certified finds make the total number of species secured five, an increase of four on the record of the previous visit. On no previous occasion have we ever found so little on an expedition.

Mr. J. Waddington reported that entomologically the district had not been productive of a large number of species. His section consisted of Messrs. G. T. Porritt, J. Waddington, E. G. Bayford, A. Whitaker, H. Staniforth, and others. Messrs. Porritt, W. Tunstall, and B. Morley had made a preliminary visit to the wood a few days previously.

Mr. Porritt writes:—Very few lepidoptera were seen, and the best species taken, including both visits, were fine melanic forms of *Boarmia repandata* and *Cidaria russata*, ordinary forms of *Orthosia suspecta*, *Tryphaena fimbria*, *Xanthia silago*, *Ephip-*

piphora bimaculana, *Sericostoma costella*, etc., whilst the local *Cymatophora fluctuosa* occurred in the larval stage on birch. Among trichoptera the most interesting find was *Crunæcia irrorata*, as it confirmed the only previous record of the species as a Yorkshire insect, nearly forty years ago. Other species were *Limnophilus sparsus* (common) and *Drusus annulatus*. Among neuroptera the genus *Hemerobius* was well represented by the six species *nitidulus*, *micans*, *subnebulosus*, *atrifrons*, *lutescens*, and *stigma*, the first three in plenty.

The Yorkshire Coleoptera Committee was represented by its President, Mr. E. G. Bayford, Messrs. H. H. Corbett, M.R.C.S., and H. Ostheide. Mr. Bayford reports that very few beetles were seen. He did not arrive until the afternoon and devoted his attention to the fungi with indifferent success. The following beetles have been determined:—

<i>Pterostichus vulgaris</i> L.	<i>Serica brunnea</i> L.
<i>Ocypus cupreus</i> Rossi.	<i>Rhagium bifasciatum</i> F.
<i>Bolitobius trinotatus</i> Er.	In rotten stump.
<i>Cryptophagus lycoperdi</i> Herbst.	<i>Apteropeda orbiculata</i> Marsh.
In puff-balls.	<i>Strophosomus coryli</i> F.
	Common on tree trunks.

For the Botanical Section Mr. H. H. Corbett writes:—Those members who devoted their attention to the phanerogamic botany of the district did not start out with any great expectations of the discovery of new additions to the local flora, nor even with the expectancy of finding any very rare species. In past years Salt, Gatty, and others have so thoroughly examined the ground that rather would one expect to note absentees than discover additions. The growth of Sheffield, and the consequent fouling of the air, and increase of the number of visitors to the woods of Wharnccliffe, have probably tended toward the extermination than increase in local varieties. The flora upon the Lower Coal Measures is never rich in numbers, and September, after a cold and wet summer, is not the best time for field botany. *Hieracium boreale* Fr. clothed the railway cuttings and embankments with its golden flower heads, while in the woods above it gave place to its relative *H. vulgatum* Fr. and another form, probably referable to *H. sciaphilum* Uechtrich. *Solidago virgaurea* L. was frequent, as also were *Neckeria claviculata* N.E.Br. and *Luzula maxima* D.C., while possibly the best find of the day in the woods was *Veronica montana*. The ponds in the deer-park produced a mud-growing form of *Ranunculus peltatus* Schrant var. *floribundus* Bab. and *R. Drouetii* Godr., together with *Scirpus lacustris* L. As an interesting bit of

negative evidence, it may be remarked that not a single species of *Carex* was seen either in the woods or in the ponds.

Dr. W. G. Smith and Mr. T. W. Woodhead had been at work in the Botanical Survey Section. Dr. Smith pointed out that Wharnccliffe Wood was probably one of the finest oak woods in the country.

Mr. Gibbs reports as follows :—The Mycological Committee was represented by Messrs. C. Crossland (Secretary), A. Clarke, C. H. Broadhead, and the writer. Wharnccliffe Woods are well known as an excellent collecting-ground for the larger fungi; consequently, after the recent heavy rains, the fungus-hunters were looking forward to a productive day's work. In this they were not disappointed. Open glades, damp shady copses, and dead trunks, branches, and stumps were all searched, and yielded their characteristic species. The grassy banks of the road through the wood to the Lodge proved very productive of *Boleti*, six species being noticed, these including *Boletus felleus* Bull., easily recognised by its flesh-coloured tubes, and *Boletus piperatus* Bull., with rusty red tubes, neither species of every-day occurrence. The damp leaf mould was rich in *Russulæ* and *Lactarii*, the finds in the former genus including two pretty and uncommon species, *R. lutea* Fr. and *R. puellaris* Fr. The most interesting finds on dead wood were *Polyporus adustus* Fr., a species somewhat resembling the common *Polystictus versicolor*, but differing in its less woody substance and grey colour, and *Calocera striata* Fr., a Tremelline distinguished from its congeners by the wrinkled or striate surface of its small, lemon-yellow, club-shaped hymenophores. Discomycetes were scarce, but included one small specimen of the pretty orange *Otidea aurantia* (Pers.). The only Myxomycete of interest noticed was a yellow plasmodium covering stems of grass and heath *Galium*. This was found and brought to the writer by Mr. Waterfall, and afterwards developed into masses of confluent yellow-green sporangia, an æthalioid form of *Physarum virescens* Ditm. The Mycologists were much indebted to some members of other sections, who picked up and brought to the meeting specimens of fungi noticed by them. More than one interesting record was made in this manner, and this fact shows how, at a general excursion such as this, the several sections may work together and help one another. In addition to those mentioned above, the following species were noticed. Species universally common, and species recorded for the locality either in Lees' Flora of West Yorkshire or in the recently published first part

of the Yorkshire Fungus Flora, are not included in the list. Where no note is made of the habitat of a species, it was found on the ground in the wood. Altogether, about 80 species were noticed, 45 being Agarics.

Collybia platyphylla Fr.

Mycena alcalina Fr.

On dead wood.

M. pullata Berk. & Cke.

Pluteus cervinus Schæff.

On dead trunk.

Entoloma jubatum Fr.

In meadow.

Inocybe rimosa Bull.

I. asterospora Quelet.

Cortinarius elatior Fr.

Agaricus silvaticus Schæff.

Stropharia stercorearia Fr.

In meadow.

S. æruginea Curt.

Hypholoma sublateritium Fr.

On stumps.

Lactarius glycosmus Fr.

L. minimus W.G. Sm.

L. subdulcis Bull.

L. pyrogalus Bull.

L. rufus Scop.

Russula vesca Fr.

R. cyanoxantha Fr.

R. cutefracta Cke.

Marasmius peronatus Fr.

M. erythropus Fr.

M. androsaceus Fr.

On dead twigs, leaves, fern,
etc.

Boletus chrysenteron Fr.

B. subtomentosus L.

B. edulis Bull.

B. scaber Fr.

Poria blepharistoma B. & Br.

Odontia fimbriata Pers.

The last two on dead wood.

Clavaria inæqualis Flo. Dan.

Typhula erythropus Fr.

On dead herbaceous stems.

Stereum sanguinolentum Fr.

Corticium sanguineum Fr.

Both on dead wood.

Thelephora laciniata Pers.

On the ground on dead leaves,
twigs, etc.

Calocera cornea Fr.

On dead trunks.

Helotium scutulum Karst.

On dead herbaceous stem.

Dasyscypha nivea (Hedw.).

On dead trunk.

Mr. M. H. Stiles stated that the Micro-Botanical Section had done some collecting, but the results could not be ascertained until the material had been worked out under the microscope.

Mr. Stiles has since reported:—In conjunction with Mr. H. Moore, of Rotherham, several gatherings were made both going up the Crags and on the return journey, none of which were specially productive. At the pond, however, about a mile from the Lodge, the appearances were more promising, and, although the prepared slides of diatoms have not been entirely worked out, the following results have been obtained:—

Amphora ovalis var. *affinis*.

Cymbella gastroides.

C. cistula.

Navicula Legumen.

**N. radiosa*.

N. cuspidata.

N. rhynchocephala.

N. humilis.

N. limosa.

Navicula Iridis var. *producta*.

N. Iridis var. *amphirynchus*.

N. lanceolata.

N. anglica.

N. borealis.

N. bacillum.

N. ventricosa var. *minuta*.

N. Stauroptera var. *parva*.

N. Braunii?

Navicula major.	*Eunotia lunaris.
N. viridis.	E. lunaris var. bilunaris.
N. appendiculata.	E. exigua.
Pleurosigma Spencerii.	Synedra Ulna.
*Gomphonema constrictum	S. acus.
var. capitatum.	Vanheurckia vulgaris.
G. acuminatum.	Fragilaria capucina.
Amphipleura pellucida.	*Tabellaria flocculosa.
Cocconeis placentula.	Surirella biseriata.
Eunotia arcus.	S. robusta.
E. pectinalis var. curta.	S. (species unknown).
E. pectinalis var. ventricosa.	*Nitzschia sigmoidea.

The forms met with more freely were those thus marked *. *Tabellaria flocculosa* was particularly plentiful in the streamlets on the slopes of the Craggs, and *Nitzschia sigmoidea* in the pond.

DESMIDS.—The pond yielded the following forms:—*Desmidium Schwartzii* (plentiful), *Pleurotenium trabicula* var. *clavata*, *Closterium acerosum*, *C. lunula*, and a *Docidium* (undetermined).

Mr. Moore reports:—The following species were found in the two far ponds in the deer park, the pond near the Lodge, and a pond on the right-hand side of the road leading to Oughtibridge Station. The pond near the Lodge was very prolific in *Anuraea aculeata* having great variation in the length of the rear spines, many individuals having a single spine only.

ROTIFERA.	Synchæta pectinata.
Anuraea aculeata.	S. tremula.
A. serrulata.	FLAGELLATA.
Notommata aurita.	Anthophysa vegetans.
Rotifer vulgaris.	Peridinium tabulatum.
R. macrurus.	Synura uvella.
Sacculus viridis.	RHIZOPODA.
One specimen.	Diffugia proteiformis.

The results altogether were much more satisfactory than we anticipated.

Mr. E. Hawkesworth stated that the Grenoside rock, though forming a prominent feature in the Craggs, was hardly expected to yield many geological specimens. Mr. C. Bradshaw referred to a curious case of current-bedding observed in a block of grit, and also to some casts of plant-remains in the same rock.

After the meeting most of the members took the opposite direction to Oughtibridge, from which station the return journey was made. This gave them a slightly different aspect of these beautiful woods, and a favoured few heard glowing accounts of the charms and attractions of Wharnccliffe Woods many, many years ago!

T. S.

Naturalist,

SEARCH FOR HEPATICS AT HAWES.

WILLIAM HENRY PEARSON,
Manchester.

ON 3rd August I left home in the early morning for Hawes, and was joined by two botanical friends, Messrs. Jackson and Wetton. Time being short, we hastened to what we thought would be good ground, and made our way to Aysgill Force. We picked up an old horse shoe, and were followed by a frisky black kitten, which we had a difficulty in frightening back. With these good omens we pressed forward through fields, and finally found our stream, the banks of which were on the one side ornamented with magnificent tufts of the large *Campanula latifolia*, and on the other with beds of *C. rotundifolia*, with flowers the size of which I had never seen before. Our first collecting was done at a spring by the path side, the margin of which was clothed with *Jungermania riparia* Tayl. and the innermost recesses with large patches of *Conocephalus conicus* L., very fine, but, of course, barren. We walked by the margin of the stream, finding it impossible to get down to the bed until we got to the Force, where we descried a path used by fishermen. This we with difficulty descended, but found we could only proceed a few yards on account of the precipitous rocks. On the other side of the stream were moss-covered boulders, and the side of the water was green with mosses and hepatics. We took our boots and stockings off and rolled our nether garments up as far as we could and got safely across. Immediately on rocks below the Fall we gathered patches of the large form of *Jungermania riparia*, in fine condition, with male flowers. This was the commonest species, assuming different forms according to the habitat of the plant. Some of the Continental botanists are disposed to make species of the smaller forms; certainly when the specimens are dried they look very different, but I have very little doubt they are one and the same species, slightly differentiated by their habitat. On two of the rocks in the stream I collected specimens of *Scapana æquiloba* (Schwægr.), looking very distinct from the larger form, which is now known as *S. aspera* Bern. The colour of some plants was reddish, and very different from the plants of *S. aspera* which I had obtained in quantity at Abergele. Mr. Jackson collected on another boulder small specimens of *Radula complanata* (L.), which I thought

at the time might be *R. Lindbergi* G., as I could only see with the lens male spikes; under the microscope at home I found young archegonia immediately above the male flowers. With some of the hepatics it is hardly safe to venture the name in the field, as the acute John Nowell used to say, 'He would not like to say by this here light,' when asked to name some doubtful species whilst collecting. The rarest species we met with, and that only very sparingly, was *Pedinophyllum interruptum* (Nees), found growing closely appressed to some of the loose rocks and on the cliffs. *Jungermania Bantriensis* Hook. var. *Muelleri* (Nees) was next to *Jung. riparia*, the commonest species on the rocks. The further consideration of this species leads me to the view that it is distinct from the type; even the larger forms of it have a different *facies* from the typical form found growing on moss-covered banks below Dolbadarn Castle, Llanberis, and from the original species collected by Miss Hutchins in the South of Ireland. Along with this species was the form of *Lophocolea bidentata* (L.), with small acute segments, which I believe is the form *Hookeriana* of some authorities. Also growing with other species I found stems of *Cephalozia bicuspidata* (L.) and *Blepharostoma trichophyllum* (L.). On the dripping rocks were fine patches of *Pellia calycina* (Tayl.), growing with fine *Hypna*, and, on dry rocks, *Preissia commutata* (Lindenb.) Nees. One small patch of *Marchantia polymorpha* L. was also observed. *Plagiochila asplenoides* (L.) var. *Dillenii* (Tayl.) was growing more or less freely on the rocks, and on the wet slopes *Nardia scalaris* (Schrad.). By its side, creeping over compact tufts of moss was an *Aneura*, which I have not been able to identify.

We now found we were unable to proceed further on account of the steepness of the cliffs and depth of the stream, so we retraced our steps. We found at Hawes that we had just time to spend about half an hour at Hardraw Scaur, on the dry broken rocks to the left of the Fall, where *Cystopteris fragilis*, *Asplenium Trichomanes*, and *Scolopendrium vulgare* were growing from the crevices. Here I met with a large patch of *Porella laevigata* (Schrad.), and further up the valley *P. platyphylla* (L.) was somewhat common on the exposed rocks. We were somewhat disappointed at the paucity of the Hepaticæ in this most beautiful glen. At Hawes I collected in a small wood on the left before crossing the bridge *Metzgeria furcata* (L.).

I have deposited in the Manchester Museum specimens of the species collected for future reference.

YORKSHIRE COLEOPTERA IN 1902.

M. LAWSON THOMPSON. F.E.S.,

Saltburn-by-the-Sea;

Hon. Secretary Yorkshire Coleoptera Committee.

THE season 1902 has not been a very favourable one for the coleopterist, there being few warm, sunny days during the summer to bring beetles under observation. Nevertheless a few really interesting species have been met with. Members of the committee attended the meetings of the Yorkshire Naturalists' Union at Coxwold, Bawtry, Baugh Fell, and Brimham Rocks. At Coxwold (on May 19th) I met with 38 species, a list of which is included in the Rev. T. Ainsworth Brode's account of the meeting.* The coleopterists present at the Bawtry meeting (on July 10th) were Messrs. E. G. Bayford and H. H. Corbett, who did a little collecting in spite of the heavy rain; 18 species were found.† Mr. H. Ostheide and the writer visited Baugh Fell on August 2nd and 4th, and our joint list contains 50 more or less common species. Brimham Rocks, on September 24th, proved a fairly good locality, and I met with 35 beetles.

Mr. H. H. Corbett has done some good work in the neighbourhood of Doncaster, and kindly furnishes me with some notes on the results of his collecting.

The following is a list of the most interesting coleoptera taken during 1902. I have selected from material before me only such species for which the Yorkshire records are at present deficient. Those marked with an asterisk seem to be altogether new to the county. B. = E. G. Bayford, C. = H. H. Corbett, H. = W. C. Hey, O. = H. Ostheide, T. = M. L. Thompson.

Notiophilus substriatus Wat. Cusworth, near Doncaster (C.).

Blethisa multipunctata L. Ryhill Reservoir, near Barnsley, one specimen in September (B.).

Badister sodalis Duft. (*humeralis* Bon.). Edlington, near Doncaster (C.).

Chlænus vestitus Payk. Eight specimens on the cliffs between Bridlington Quay and Sewerby (H., 'The Naturalist' for 1902, p. 259).

Bradycellus placidus Gyll. Wheatley Wood, near Doncaster (B. and C.).

Amara similata Gyll. Doncaster (C.).

Anchomenus marginatus L. Carrhaze Pond, Filey (H.). Cusworth, near Doncaster (C.). Worsborough Reservoir, near Barnsley (B.).

Bembidium atrocæruleum Steph. Hebblethwaite Gill, near Sedburgh (O.).

* *Aëpus marinus* Strom. Saltburn, on the coast; under large stones embedded in shingle at high-water mark, June (T.).

* 'The Naturalist' for 1902, p. 283. † 'The Naturalist' for 1902, p. 375.

- Metabletus foveola* Gyll. Thorne Moor (C.).
- Hydroporus morio* Dej. and *melanarius* Sturm. In pools on Baugh Fell (O.).
- Agabus congener* Payk. In a mossy pool on the slope of Mickle Fell, April (T.).
- Chœtarthria seminulum* Herbst. Sandal, near Doncaster (C.).
- Aleochara ruficornis* Grav. Saltburn, at the foot of the sea-banks; one specimen in September (T.).
- **Homalota occulta* Er. Saltburn, in a dead gull on the coast, September (T.).
- **Homalota atricolor* Sharp. On the moor at Brimham Rocks, September (T.).
- Phytosus spinifer* Curt. Saltburn, common in dead gulls on the coast, September (T.).
- **Tachinus pallipes* Grav. Saltburn Wood, in decaying fungi, one specimen in September (T.).
- Megacronus inclinans* Grav. Wheatley Wood, near Doncaster (C.).
- Mycetoporus lepidus* Grav. Wheatley Wood (C.).
- Quedius nigriceps* Kr. Wheatley Wood, in wet hay (C.).
- Staphylinus stercorarius* Ol. Douker (Dovecote) Gill, near Sedbergh (O.).
- Philonthus intermedius* Boisd. Edlington, near Doncaster (C.).
- Philonthus proximus* Kr. (*succicola* Thoms.). Wheatley Wood, in dead hedgehog (C.).
- Othius læviusculus* Steph. Sandal Beat, near Doncaster (C.).
- Stilicus rufipes* Germ. Thorne Moor, near Doncaster (C.).
- Oxyopus rufus* L. Wheatley Wood (C.). Near Ryhill (near Barnsley), September (B.).
- Lathrimæum atrocephalum* Gyll. Wheatley Wood (C.).
- **Proteinus atomarius* Er. Saltburn Wood, in decaying fungi, September (T.).
- Prognatha quadricornis* Lac. Wheatley Wood, under bark of elder (C.).
- Liodes humeralis* Kng. Wheatley Wood, in fungi (C.).
- **Scaphisoma boleti* Panz. Saltburn Wood, in decaying fungi, September (T.).
- Omosita depressa* L. Saltburn Wood, in decaying fungi, one specimen in September (T.).
- **Pocadius ferrugineus* F. Saltburn Wood, in decaying fungi, Sept. (T.).
- Cychramus luteus* F. Edlington Wood, near Doncaster (C.).
- **Cerylon histeroides* F. Wheatley Wood (C.).
- Antherophagus nigricornis* F. Wheatley Wood (C.). On the moor at Brimham Rocks (T.).
- Cryptophagus lycoperdi* Herbst. Abundant in Wheatley Wood (C.).
- **Apion cruentatum* Walt. Dacre, near Brimham Rocks, in Sept. (T.).

BIRDS.

Albino Ring Ouzel at Middleton-in-Teesdale.—A perfectly white Ring Ouzel was obtained at Stotterley Lane, Middleton-in-Teesdale (Co. Durham), on 27th July 1903. It is a bird of the year, and is now in the possession of Mr. W. Walton, of Middleton.—C. E. MILBURN, Middlesbrough.

FIELD NOTES.

MAMMALS.

A Stoat's Larder.—In a Stoat's nest here a gamekeeper this spring found, besides the usual remains of young Rabbit and Hare, the shells of about a dozen eggs of the Common Lapwing. On comparing notes with a neighbouring keeper, he, however, ascertained that his experience was not unique. It is supposed that the eggs were not taken until they were hard set, and contained young birds, the eggs then being more easily carried without damage to their contents, and possibly more welcome to the young of the Stoat. I may add that a small terrier invaded the hole, and one by one killed and dragged out the two parents and five young ones. One of the parents at first emerged from the hole and attacked the dog outside, but, being slightly bitten, retired within, and declined any longer to assume the offensive.—EDWARD T. BALDWIN, Waberthwaite, Cumberland, 5th September 1903.

MOLLUSCS.

Mollusca at Huttoft Bank, Lincolnshire.—On the occasion of the Lincolnshire Naturalists' Union Meeting at Sutton-on-Sea, on 2nd July 1903, special attention was given to freshwater mollusca in the drains at Huttoft Bank, Div. 11 N. The result was somewhat disappointing, only about nine species were noted. With the exception of *Aplexa hypnorum*, which was in considerable numbers, they were not very plentiful. The following is a complete list of those recorded:—*Aplexa hypnorum*, *Succinea elegans*, *Bythinia tentaculata*, *Limnæa peregra*, *L. palustris*, *Planorbis umbilicatus*, *P. spirorbis*, *Valvata cristata*, *Pisidium obtusale*. Near the sandhills numerous Thrush-stones, at which were remains of *Helix nemoralis*, were noted.—C. S. CARTER, 8, Bridge Street, Louth.

COLEOPTERA.

***Pyroptera affinis* near Doncaster.**—While sweeping poplars to-day in Wheatley Wood, I caught *Pyroptera* (Muls.) *affinis* (Payk.) close to the same spot where Mr. Bayford took the larva of the same insect some years ago.—H. V. CORBETT, Doncaster, 7th July 1903.

Beetles in Peat.—At pp. 14 and 156 of 'Geological Rambles in East Yorkshire' Mr. Sheppard refers to remains of coleoptera having been found amongst peat. It is a matter for regret that

these have not been submitted to some competent coleopterist for identification. Mr. George Darley, of Hatfield, has found several remains under the peat at Hatfield Chace. The only species yet determined is *Hydrophilus piceus* L., the Great Water Beetle, of which species Mr. Darley was fortunate enough to find an almost complete skeleton. This example is now in the possession of Dr. Corbett. To-day this species is restricted, so far as the British Isles are concerned, to the London district and adjoining counties.—E. G. BAYFORD, Barnsley.

FLOWERING PLANTS.

Notes on Sedbergh Plants.—*Orobanche major* Angl. has been growing here this season on the roots of Broom, and we have also seen for the first time *Saxifraga Hirculus* L. Over the Westmorland border we have found many specimens of *Paris quadrifolia* L. with leaves varying in number from three to seven.—JOHN HANDLEY, Sedbergh, 16th July 1903.

Plants at Sutton-on-Sea.—At the meeting of the Lincolnshire Naturalists' Union at Sutton-on-Sea, on 2nd July 1903, the following species were noted on the marine (blown) sand:—*Ranunculus arvensis*, *Papaver somniferum*, *P. argemone*, *Cerastium semidecandrum*, and *C. arvense*, *Ononis spinosa*, *Ceanothe Lachenalii* out of place except on the silt, where it was abundant; *Daucus carota* approaching *gumruifer*, *Lycium barbarum*, *Juncus Gerardi*, *Scirpus maritimus*, *Agrostis palustris*, *maritima*, with the sand series of most confusing *Agropyrons*. A poor list! The marine silt (estuarine alluvium) within the sand hills was far richer, including *Ranunculus trichophyllus*, *Genista tinctoria*, *Trifolium pratense*, *perenne* (of Sinclair's *Hort. Gram. Wobur.*) which has been so foolishly neglected for the foreign variety *sativum*; *Vicia cracca*, *incana*, grey white with dense hairs; both the *Siums*; *Anthriscus vulgaris* on both sand and silt; *Achillea Ptarmica*, *Serratula*, *Picris echioides*, *Samolus*, *Myosotis palustris*, and *Lithospermum arvense*, *Rumex Hydro-lapathum*, and lastly *Iris spuria*. This lovely species was in full flower on the old spot, though it cannot now be found in many cases where it was five years ago. Specimens were taken for the National Herbaria.—E. ADRIAN WOODRUFFE PEACOCK, Cadney, Brigg, 20th July 1903.

A Grass new to Britain, and other Plants at Careby, Lincolnshire.—At the meeting of the Lincolnshire Naturalists' Union at Careby, on the 9th June 1903, 230 species were observed, and the following species were taken:—*Ranunculus*

Naturalist;

parviflorus, *Cerastium glomeratum* and *C. semidecandrum*, *Malva moschata*, *Euonymus*, *Trifolium filiforme*, *Agrimonia eupatoria*, *Pyrus torminalis*, *Saxifraga tridactylites*, *Pimpinella major*, *Cnicus eriophorus*, *C. acaulis*, *Campanula trachelium*, *Myosotis versicolor*, and *M. umbrosa*. *Hyoscyamus*, *Lamium decipiens*, and *L. galeobdolon*, *Paris*, *Festuca sciuroides*. Along with this last species, a densely caespitose grass peculiar to Western Europe but hitherto not found in Britain, was found. It is *Festuca maritima* Linn. or *Nardurus unilateralis* Boiss. It was taken on the most arid cornbrash, and will no doubt be found on similar spots in Rutland and Northamptonshire close by. At Holywell on the 8th, in addition to the foregoing species *Viburnum Lantana* was common in hedges and woods on the Boulder Clay with *Sanicula europæa* in abandoned quarries, and *Habenaria chloroleuca* on Lincolnshire Limestone.—E. ADRIAN WOODRUFFE PEACOCK, Cadney, Brigg, 23rd June 1903.

ALGÆ.

Diatoms at Filey Brig.—On the occasion of the Yorkshire Naturalists' Union meeting at Filey, on 1st June, several gatherings made by washing from algæ and scraping from rocks yielded the following forms:—

Actinopterychus undulatus Ehr.*

Amphora inflexa Breb.

Amphiprora paludosa W. Sm.

Biddulphia aurita (Lyng) Breb.

Cocconeis scutellum Ehr.*

Coscinodiscus excentricus Ehr., *oculus iridis* Ehr., *radiatus* Ehr.

Eupodiscus argus Ehr.

Fragilaria striatula Lyng.*

Licmophora Anglica (Kutz.) Grun.,* *communis* (Heib.) Grun., *gracilis* (Ehr.) Grun.*†

Melosira sulcata (Ehr.) Kutz.

Navicula aspera Ehr., *didyma* Ehr., *directa* W. Sm., *distans* W. Sm., *inflexa* (Greg.) Ralfs.,*† *palpebralis* Breb., *scopulorum* Breb.

Nitzschia angularis W. Sm., *constricta* (Greg.) Grun., *sigma* var. *rigidula* Grun.

Pleurosigma affine var. *Normanni* Ralf.

Raphoneis amphiceros Ehr. and var. *rhombica*.

Rhoicosphenia curvata var. *marina*.*

Schizonema ramosissimum Ag. *Smithii* Ag.

Synedra affinis Kutz. and var. *fasciculata*.*

Thalassionema (*Synedra*) *nitzschiioides* Grun.†

Those marked with an asterisk (*) occurred abundantly; those marked (†) are additions to the recently-published list of diatoms for the Hull district.—R. H. PHILIP, Hull, 26th June 1903.

MOSES and HEPATICS.

Mosses at Caistor.—On the excursion of the Lincolnshire Naturalists' Union on 28th August 1902, Miss S. Allett and the Rev. W. W. Mason collected mosses. Twenty-six mosses and three hepatics were taken, but as Div. 3 has been fairly well worked only four mosses and one hepatic were new to the division, *Fissidens taxifolius* Hedw., *Barbula fallax* Hedw., *Amblystegium filicinum* De Not., *Hypnum commutatum* Hedw., and *Marchantia polymorpha*.—S. C. STOW, Grantham.

Mosses at Careby.—A quantity of mosses were taken on the Lincolnshire Naturalists' Union meeting on 9th June 1903, but nearly all were noted at a former meeting at Careby (July 1900). Those not seen then and, as far as I know, new to Division 16, are:—*Funaria hygrometrica* Sibth., abundant on a patch of burnt ground in Monk's Wood; *Zygodon viridissimus* R.Br., *Leucodon sciuroides* Schwgr., *Eurhynchium striatum* B.&S., *E. piliferum* B.&S., *E. rusciforme* Milde., and *Hypnum molluscum* Hedw. The hepatic *Plagiochila asplenioides* was taken in Monk's Wood.—S. C. STOW, Court Leys, Brandon, Grantham.

REVIEWS AND BOOK NOTICES.

Mr. Arthur Bennett, F.L.S., has sent us a reprint of his valuable paper on the 'Distribution of *Peucedanum palustre* and *Lathyrus palustris* in Britain.' (Trans. Norfolk and Norwich Naturalists' Society, Vol. 7, Part 4, 1903, pp. 467-476). Mr. Bennett enumerates several Yorkshire and other northern county records.

The Proceedings and Annual Report of the Liverpool Geological Association for 1901-1902 has just been issued. It contains 42 pages, and reads rather like a reprint of the Secretary's minute book. We should like to see more original notes in this publication, and they should have reference to the Liverpool district.

The most valuable paper in the Eighth Report of the Southport Society of Natural Science, just issued, is the Presidential address of Mr. Harold Brodrick, dealing with the geology and antiquities of 'Martin Mere.' We should like to see more papers of this character, and fewer of the type of 'Pond Life,' 'Cremation,' etc., which, interesting in their way, add little or nothing to our knowledge of the natural history of the Southport district, the printing of which must be a burden on the society's funds.

Judging from the reports of the various sections printed in the 'Annual Transactions of the Manchester Microscopical Society,' for 1902, just to hand, the society is accomplishing excellent work. There are several papers of general interest (including the presidential address of Prof. S. J. Hickson), some of which are illustrated by excellent plates. The papers of particular interest to our readers (though some are rather short) are 'The Microscopic Structure of Mountain Limestone,' by J. Barnes, F.G.S.; 'A Visit to the Sound (Isle of Man),' by A. P. Bradshaw; and 'Some Features of East Lincolnshire,' by C. Turner, F.C.S. The Report contains 108 pages and is sold at 1s. 6d.

The Thirty-second Annual Report of the Chester Society of Natural Science, etc. (for 1902-3), is to hand. Nineteen of its 38 pages are occupied by a list of its 971 members and their addresses. Two items, however, are of interest. One (occupying half a page) is entitled 'A few Bird Notes for the Year,' by Mr. S. G. Cummings; the other is the Meteorological Report for 1902, by the Rev. J. C. Mitchell.



A Naturalist's Calendar kept at Swaffham Bulbeck, Cambridgeshire, by Leonard Blomefield, edited by Francis Darwin (20 + 84 pp., cloth), has just been issued by the Cambridge University Press. The calendar is founded on observations made between 1820 and 1831, and from these dates he calculated the mean date and recorded the earliest and latest occurrence of each phenomenon (plant, insect, bird, etc.). The book will be most useful for comparison with similar records made nowadays.



NORTHERN NEWS.

On 21st September four tourists were killed in trying to climb a difficult part of Scafell.

The Rev. W. W. Mason has presented his collection of 200 species of British Mosses to the Bootle Museum.

Mr. F. Cavers, B.Sc., of the Yorkshire College, Leeds, has accepted an appointment at the Technical School, Plymouth.

'The Halifax Naturalist' for August contains an introduction to the Fungus-Flora of Halifax, by Mr. C. Crossland, F.L.S.

Mrs. E. J. Collingwood Wilson, of Scarborough, has bequeathed £200 to the Mayor and burgesses of Scarborough for the Museum.

Mr. S. L. Mosley has recently made a tour round several museums, and gives a brief account of them in 'Nature Study' for September. The Museum at Derby 'is very poor, and a disgrace to the town.'

The same journal contains a record of Sabine's Gull on the Yorkshire coast, on the authority of Mr. C. Jeffreys.

Indications of contamination in Cleethorpes oysters having been discovered, the beds have been closed until steps can be taken to remove the cause of infection. The Grimsby sewage outfall is only two miles away.

In a report of an account of a recent excursion of the Barrow Naturalists' Field Club to Millom, Mr. Harper Gaythorpe gives a description of an extensive poaching affray in Broughton Park, Lancashire, so long ago as 1552.

In connection with the Cumberland Educational Committee a Summer Holiday Course of Lectures in Nature Study, for teachers, has recently been given, under the direction of Mr. T. Postgate. This was largely botanical, and was supplemented by field rambles. The course proved highly successful, and will no doubt be repeated.

During the last two years Mr. W. Mark Pybus, the president of the Natural History Society of Northumberland, Durham, and Newcastle-upon-Tyne, has given a review of the society's field work as his presidential address. This example might well be followed by other presidents, particularly as the subject necessitates their attendance at the field meetings.

About 1,000 acres of land in the valley of the Trent, near East Ferry, about nine miles from Gainsborough, is to be 'reclaimed.' Arrangements are being made for the area to be 'warped' and transformed from 'waste' to useful agricultural land. The district has long been known as a favourite haunt of wild fowl, and all naturalists will regret the loss of still another slice of 'natural' England.

Mr. W. Eagle Clarke, F.R.S.E., of the Edinburgh Museum of Science and Art, is spending a month on a lightship in order to study the phenomena of bird migration on the coasts of Britain. Encouraged by the importance of the scientific results obtained during his sojourn in the Eddystone Light-house in the autumn of 1901, Mr. Clarke has stationed himself upon the Kentish Knock Lightship, which is situated off the mouth of the Thames. He hopes to have exceptional opportunities for observing the east to west autumnal movements across the southern waters of the North Sea.

Probably the first book on birds which treats them in anything like a modern scientific spirit, and not from the medical point of view adopted by the earliest writers, is 'De Historia Avium,' by William Turner, published at Cologne in 1544. Turner was born at Morpeth, in Northumberland, but frequently had to take refuge on the Continent. In the opinion of Mr. A. H. Evans, Turner's work bears evidence of a knowledge of his subject, 'which would be distinctly creditable even to a modern ornithologist.' The Cambridge University Press has recently published a translation of this early ornithological work, which will be of great service to all naturalists interested in bird life.

A recent issue of 'The Spectator' * contains an excellent article on the subject of 'The Natural Gardens of the River Eamont,' which divides Cumberland from Westmorland. It is pointed out that this natural garden has not sprung up by itself; it has been made, in part, by the spates and floods of the river. Such a garden, also, 'must be on land not cultivated, and which cattle do not browse. This is secured on the banks of the Lower Eamont by the margin between the high flood mark and the normal level of the river, and by the exquisite survival of moor and crag known as Udford Rocks. There are, in fact, two wild gardens adjacent, each looking on the clear and flowing river—the upper, or rock garden, and the lower, or herbaceous border, with line behind line of flowers, following the course of the river. Sometimes the rocks descend to the waters, and there the gardens mingle, harebells and stonecrops, and tiny wild pink geraniums growing on the sunny banks of red-grey rocks, round whose feet the waters swirl; while by their sides, springing from the moist river soil, grow tall mauve campanulas and masses of meadow-sweet. Nor must it be forgotten that on the north or cool side of the gorge are a series of natural ferneries and moss grottoes, hanging above the flower line.'

The first principle in the naturalist is the love of Nature, and this was possessed in an eminent degree by the Rev. Richard Wilton, M.A., Rector of Londesborough, who entered into rest on the 10th of August, at the age of 76. He was a native of Doncaster. As a poet he is widely known by his sonnets, which rank so highly that they enrich all recent anthologies. I have taken up at random 'Sungleams,' for a quotation to justify his claims to the recognition of the 'Naturalist,' and from abundant passages I select the following:—

'Nature, be thou my minstrel, ever nigh
To minister thy tranquillising aid;
At sultry noontide or in evening shade,
Lend me thy solace when I droop or sigh.
Play to me, minstrel, in the whispering wind,
The rippling water, and the rustling tree,
And smooth and harmonise the ruffled mind.'

Canon Wilton will be long remembered as a lover of men and of the Nature in which they moved.

We think of you, as tenderly we take
Your volumes, rich with Nature's outward grace,
And if a sigh the breathing pages shake,
'Tis wrought of time and memory's embrace:
Dear unto you, from Nature's living face,
Smiled the deep wisdom that the green years make.

E. L.

* 29th August, pp. 307-8.

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GEOLOGY AND PALÆONTOLOGY, 1901.

Compiled and edited by

THOMAS SHEPPARD, F.G.S.

Particulars of papers, etc., omitted from the following list will be gladly received and included at the commencement of the 1902 Bibliography. Every effort will be made, however, to ensure these lists being as complete as possible.

The lists for 1902-1903 are almost ready, and will be published as soon as possible, and it would render them more complete if editors of periodicals, secretaries of societies, and especially authors of papers in local journals, etc., would send copies to the editor at the Museum, Hull. Reprints and authors' separate copies should bear the name of the publication, the number of the volume or part, the *original* paging, and the *actual* date of publication.

As regards dating, we would suggest to editors and secretaries that care be taken to give the actual date of publication on the wrapper of all parts of journals and transactions; there is often difficulty and uncertainty. Bibliographers would greatly appreciate attention to this point.

The Watsonian vice-counties are adopted throughout these bibliographies as more convenient and uniform in extent than the political counties; those comprised within the North of England are the following:—

53, Lincoln S.; 54, Lincoln N.; 56, Notts.; 57, Derby; 58, Cheshire; 59, Lancashire S.; 60, Lancashire W.; 61, York S.E.; 62, York N.E.; 63, York S.W.; 64, York Mid W.; 65, York N.W.; 66, Durham; 67, Northumberland S.; 68, Cheviotland; 69, Westmorland with Furness and Cartmel; 70, Cumberland; and 71, Isle of Man; with their adjoining seas.

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„ 1885,	„	Nov. 1886,	pp. 349-362.
„ 1886,	„	June 1888,	pp. 178-188.
„ 1887,	„	Feb. 1889,	pp. 61-77.

- For 1888, in 'Naturalist,' April-May 1890, pp. 121-138.
 „ 1889, „ Nov. 1890, pp. 339-350.
 „ 1890, „ Oct.-Nov. 1891, pp. 313-330.
 „ 1891, „ July-Aug. 1892, pp. 219-234.
 „ 1892, „ Sept. 1893, pp. 265-279.
 „ 1893, „ Sept.-Oct. 1898, pp. 273-296.
 „ 1894, „ March-April 1899, pp. 81-103.
 „ 1895, „ Oct.-Nov. 1899, pp. 305-324.
 „ 1896, „ June 1900, pp. 173-191.
 „ 1897, „ Jan.-Feb. 1901, pp. 17-36.
 „ 1898, „ Oct.-Nov. 1901, pp. 305-324.
 „ 1899, „ Oct. 1902, pp. 317-336.
 „ 1900, „ April, 1903, pp. 141-160.

I have to thank Mr. W. Denison Roebuck, F.L.S., and Mr. Alfred Harker, M.A., F.R.S., F.G.S., for assistance.

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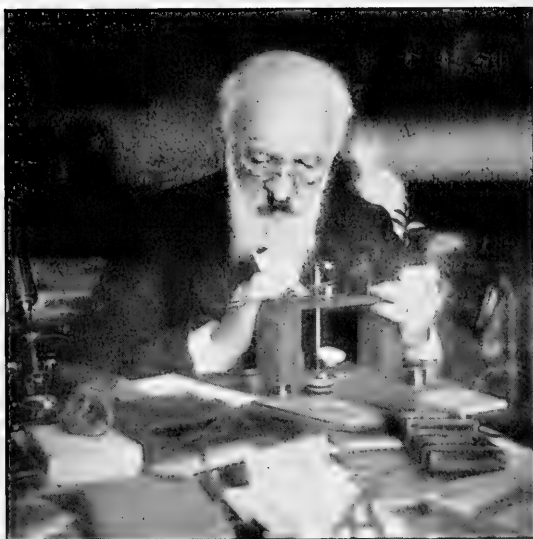
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Yours Cordially
Washington Fear Dale

NOTES AND COMMENTS.

WASHINGTON TEASDALE, 1830-1903.

At the ripe age of 73, whilst attending the meeting of the British Association at Southport in September, Mr. Washington Teasdale, of Leeds, was seized with an illness which resulted in his death a few days later. A familiar figure is thus removed from the meetings of the various scientific societies, not only in his native city, but also from larger associations in different parts of the country. He was principally interested in astronomy and photography, in connection with each of which he devoted much labour and research. He was one of the pioneers of photography in this country, and it was to him and to Mr. Ramsden that the credit was due of founding in Leeds what was actually the first photographic society in the world. He always retained his interest in photography, kept himself in close touch with its progress, and familiarised himself with every new process that was brought forward. His camera was his invariable companion in his travels, and was constantly in use. He was one of the first to adopt the modern method of illustrating lectures by lantern slides, and has given several hundred lectures on various scientific subjects to societies throughout the country. Teasdale was a Fellow of the Royal Astronomical Society and of the Royal Meteorological Society, and founder and President of the Leeds Astronomical Society, and also contributed to the welfare of the Leeds Naturalists' Club and Scientific Association, the Leeds Institute, and the Yorkshire Naturalists' Union, of which he was a member from the first. Another of his hobbies was the microscope, and he possessed an extensive and varied collection of slides. It is indeed this science of microscopy which was his point of contact with the scope of action of 'The Naturalist,' and as the populariser of this instrument he did good yeoman service to the naturalists of Yorkshire. He was what he himself called a 'brass and glass man,' in contradistinction to the users of the instrument, who were in similar parlance the 'slug and bug men,' these being the two categories of individuals who in conjunction formed the Royal Microscopical Society of London and other societies of like aims. The accompanying illustration shows Teasdale at work with his own invention, the Field Naturalists' Microscope. It is from a photograph taken in August last, lent by Mr. W. Denison Roebuck, who has also kindly supplied most of the information in this notice. Not being a great writer, we have little of Teasdale's work left to us in a permanent form. But he appreciated and studied the

work of others, and frequently purchased and distributed to his friends copies of any work that particularly pleased him. In Teasdale, Yorkshire Naturalists had an enthusiastic and interesting companion, and one who was ever ready to give the benefit of his knowledge to others. He leaves a place in the intellectual life of Leeds which can never be occupied in the same manner by anyone else, and at the meetings of the scientific societies of the town and among his own intimate circle of friends his amiable, cheery personality and the enthusiasm with which he ever associated himself with every worthy cause will be held long in affectionate remembrance. His wife and only child died some years previously.

PREHISTORIC TODMORDEN.

The recently-opened museum at Rochdale has acquired an interesting collection of local relics of the pre-Roman occupation of the district. Amongst these are some fine British vases from Todmorden, shown in the accompanying illustration. They were



British Vases from Todmorden.

found by Messrs. T. Wilkinson and Robert Law in 1898 within an earth-circle locally known as 'the Frying-pan.' Amongst them are cinerary urns, containing cremated human remains, and the curious small vessels, known to antiquarians as 'Incense-cups.' A description of the objects appears in the October 'Reliquary,' the proprietors of which have kindly lent the block.

Naturalist,

THE SOUTHPORT HANDBOOK.

The 'Handbook of Southport and District,' prepared for the recent meeting of the British Association is a useful guide to the geology, natural history, etc., of the district. It is also of convenient size and attractive in appearance. It contains the work of



(a) The Crosby Boulder of Gypsum.



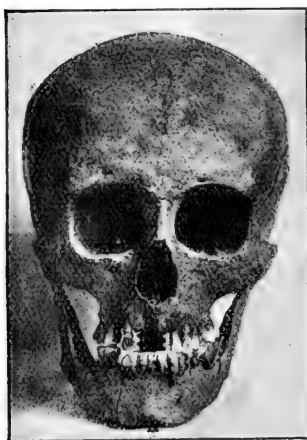
(b) Prehistoric Canoe from the Bed of Martin Mere.

various authors, under the general editorship of Messrs. Chaster, Johnson, Brodrick, and Cheetham. The Southport Society of Natural Science has also rendered valuable aid in its preparation. At the end are two maps, one being a geological sketch map of the district. The volume is well illustrated, two of the blocks

being reproduced herewith by the kindness of Mr. Hillman and Mr. H. Brodrick. It is a pity, however, that there is not more uniformity in the size, etc., of these various handbooks. Each year the handbook is of different size, colour, and thickness.

DANES' GRAVES.

Dr. W. Wright has recently subjected a collection of 22 British skulls from the so-called Danes' graves, near Driffield, to a careful examination, and gives the result of his work in a paper in the journal of the Anthropological Institute, recently issued. The skulls, which are in the Driffield Museum, belong to a mixed people, and probably date from the early part of the



Front and side views of a Skull from the Danes' Graves.

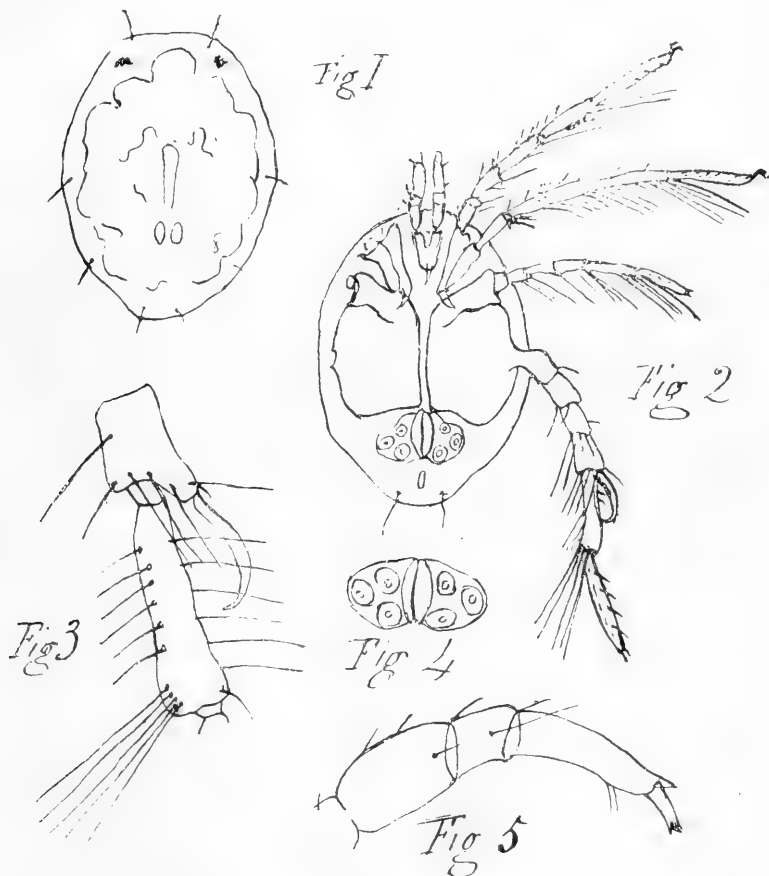
Iron Age. In the author's opinion the occupants of the Danes' graves were the direct descendants of the British Neolithic race, who lived comparatively unmixed through the lengthy Bronze Age, or they were settlers from the Continent belonging to a race which was more or less identical with that of the British neolithic dolichocephals. The latter hypothesis is the more likely one. Dr. Wright's paper is accompanied by elaborate and carefully prepared tables giving cranial and facial measurements, indices, etc., of the various skulls, and several photographs, two of which are here reproduced by the kindness of the Institute.

LINCOLNSHIRE FRESHWATER MITES.

C. F. GEORGE, M.R.C.S.,

Kirton-in-Lindsey, Lincolnshire.

Pionides ensifer (Kœnike) Sig Thor. This small but very remarkable mite has been the subject of much thought to systematic writers and students of water mites. In 1895 it was



Pionides ensifer (Kœnike) Sig. Thor.

described by Kœnike under the name of *Piona ensifera*; in 1897 Piersig described it as *Piona ensiformis*, and in 1901 as *Laminipes*
1903 November 1.

ensifer. Sig Thor, however (see 'Nyt Magazin for Naturvidenskaberne' B. 41, H.I. Kr. ania 1903), considers that the genus, '*Laminipes*' of Piersig, cannot be established, and that this mite ought to be separated from the other mites with which hitherto it has been associated, and proposes the name *Pionides ensifer*. As far as my own opinion is of any value I agree with him. The most remarkable thing about this mite is the large and very conspicuous swordlike bristle to be found at the distal end of the fourth joint of the hind leg. The mite, in other respects, agrees fairly well with the general characters of '*Piona Neum*' or '*Laminipes* Piersig.' Mr. Soar's drawings, which were made from my specimen, are sufficiently characteristic to enable anyone to recognise the mite when met with.

Fig. 1.—Dorsal surface of mite.

Fig. 2.—Ventral surface.

Fig. 3.—Fourth and fifth joints of last leg much magnified.

Fig. 4.—Genital aperture plates and discs.

Fig. 5.—Maxillary palpus

Measurements:—Length, 0·88 mm.; breadth, 0·68 mm.; length of palpus, 0·36 mm.; length of first leg, 0·88 mm.; length of second leg, 1·0 mm.; length of third leg, 0·68 mm.; length of fourth leg, 1·04 mm.

GLACIAL PROBLEMS IN YORKSHIRE AND LINCOLNSHIRE.

At the recent meeting of the British Association a preliminary report of the Committee (consisting of Messrs. G. W. Lampugh (Chairman), J. W. Stather (Secretary), F. W. Harmer, P. F. Kendall, Clement Reid, and Thomas Sheppard) appointed to investigate the estuarine deposit at Kirmington, Lincolnshire, and to consider its position with regard to the Glacial deposits, was presented.

A favourable opportunity having presented itself during the summer, operations were undertaken to investigate the beds underlying the estuarine deposit, by means of boring, and the results obtained are of such general interest that it is proposed to continue the work.

While it would be premature to enter into a detailed account of the investigation, it may be advisable to state briefly the

Naturalist,

problems which are involved and the results already obtained. Attention was first called to the fossiliferous nature of the deposit by Messrs. Wood and Rome in their paper on the 'Glacial and Postglacial Structure of Lincolnshire and Yorkshire,' in which they refer to it 'as a portion of the Hessle Clay formation.' Mr. Reid gives a fuller account of the bed in his Survey Memoir on the 'Geology of Holderness' (p. 38), stating that, though the sand underlying the warp probably rested directly on the chalk, the deposit was an estuarine clay of 'Interglacial' age. Mr. Lamplugh some time later* made passing reference to the Kirmington section, and suggested that the bed was probably older than any of the Yorkshire Glacial deposits.

The warp, which is well exposed in the brickyard, is situated on a low hill about 80 feet above sea-level. The upper portion has yielded a few species of estuarine shells, but, as recent investigations have shown, freshwater shells occur in a peaty bed at its base. It is proposed to investigate the fauna and flora of this bed very carefully.

Below the warp a few feet of sand is exposed in the brickyard, but until the recent boring was put down there was no information as to the underlying bed. The boring proved a thickness of *12 feet of stiff purple clay, with foreign stones*, evidently a Glacial clay, and then 11 feet of silt, sand, and fine chalk rubble, below which it was impracticable to carry the boring without tubing the hole, for which the appliances were not at hand.

As boulder clay is seen at one corner of the pit to overlie the fossiliferous warp, there seems no doubt that the bed lies between two Glacial deposits, but it is highly desirable that the section should be carried downward to the chalk.

Thanks are due to Mr. J. Villiers, of Beverley, who very kindly put the boring down at his own cost; also to the Earl of Yarborough (landlord), Mr. Harvey (tenant), and Mr. B. P. Hankey (agent).

The Committee was reappointed, with a grant of £50. In addition to the Kirmington section, the deposits at Bielbecks, Fulford, and Sewerby are also to be investigated.

J. W. S.

* Quart. Journ. Geol. Soc., Vol. 47, 1891, pp. 384-431.

OCCURRENCE OF *LAPHYGMA EXIGUA* NEAR KEIGHLEY: AN ADDITION TO THE YORKSHIRE FAUNA.

THOMAS FIELDHOUSE,

Bradford.

ON 22nd September last in the Keighley (Yorkshire) district, whilst searching with my lamp for the female of *Scotosia dubitata*, my attention was attracted by a small Noctua flying at the light. I secured eight specimens, which, on examination, I thought to be *Laphygma exigua*. I sent specimens to Mr. J. W. Carter, Bradford, and to Mr. G. T. Porritt, Huddersfield, who confirmed my conclusion.

Mr. Fieldhouse sent me for examination three of the specimens referred to in the foregoing, whilst still on the setting boards, and there is no doubt whatever as to their identity. The moth has always been regarded in Britain as one of our greatest rarities, and confined almost exclusively to the coast of the south of England. Indeed, prior to these specimens of Mr. Fieldhouse's only three examples appear to have been recorded north of the London district—two in Pembrokeshire and one at Liverpool.—G. T. P.

LEPIDOPTERA.

Death's Head Hawk Moth near Skelmanthorpe.—A fine male Death's Head Hawk Moth (*Acherontia atropos*) was caught in a house in the village of Scissett, in this township, on 26th September. This is the first occurrence of this species in the neighbourhood of Skelmanthorpe in my experience.—B. MORLEY, Skelmanthorpe, 1st October 1903.

***Vanessa cardui* at Sutton-on-Sea, Lincolnshire.**—While at Sutton-on-Sea from 24th September to the 1st October I was surprised to see scores of specimens of the Painted Lady (*Vanessa cardui*) about the shore and neighbouring villages. Many of the specimens were absolutely perfect, as if freshly escaped from the pupa, while others were rubbed as if from a Continental flight. I never saw a specimen near a plant of *Cnicus lanceolatus*, on which the larva and imago feed, but the thistle was fairly rare and past honey-producing. The plant most frequently visited was *Leontodon autumnalis*, in two cases only *Hypochaeris radicata*.—E. ADRIAN WOODRUFFE PEACOCK, Cadney, Brigg, 5th Oct. 1903.

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MYCOLOGISTS AT HELMSLEY.—LEADERS.

C. CROSSLAND, F.L.S. G. MASSEE, F.L.S. PROF. G. T. ATKINSON,
A. CLARKE. N. CHEESMAN.

FUNGUS FORAY AT HELMSLEY.

CHARLES CROSSLAND, F.L.S.,

Halifax; Hon. Sec. Y.N.U. Mycological Committee.

THE 176th Meeting of the Union consisted of the Annual Fungus Foray. It was held at the charming little town of Helmsley, North-east Yorkshire, for the investigation of the woods and pastures in that neighbourhood. Lord Feversham kindly threw open his extensive grounds at Duncombe Park and other estates in the vicinity for this purpose. The headquarters were at the Royal Oak, where all necessary books and instruments were located. The whole of the Mycological Committee, with one exception, were present. (Mr. Wager's duties called him away on the Monday morning.) Other members of the Union who took part in the proceedings were: John Farrah, F.L.S., Harrogate; R. H. Philip and T. Sheppard, F.G.S., General Secretary, Hull; and W. A. Thwaites, Masham; about twenty in all.

Prof. G. T. Atkinson, Cornell University, New York, U.S.A., attended the meeting and proved a most welcome addition to the company. Prof. Atkinson is one of the leading American mycologists. His visit to Europe is for the express purpose 'of becoming acquainted with the interpretation of Europeans of their own species of fungi, to take notes on them in their fresh state, and to collect and preserve as many different kinds as possible for the herbarium at Cornell University for future reference and study of spores and structural characters in comparison with American forms.' A capital temporary oven, of Prof. Atkinson's own design, was fitted up at the local plumber's for drying specimens. Numerous photographs of fungi were taken.

Mr. Clarke took photographs of one or two new British species to be mentioned later.

One of the most prolific hunting grounds was the broad belt of old beech woods encircling the well-stocked deer park and the Hall. These were twice visited. Much of this ground is free from bracken and dog's mercury; it is moist and covered with decaying sticks and rich humus, just the right kind of place for our purpose. In some places these woods reach down to the river. The majority of the trees here are very old and are beginning to exhibit signs of decay. Many are now being attacked by parasitic fungi which will speedily sap their remain-

ing vitality. We noticed several of these actively at work in this direction. Not far away from each other were *Armillaria mucida*, *Fomes fomentarius*, and *Bulgaria polymorpha*, all on separate living beeches; the first and last were pushing out their fructification through the bark all round the trees for a distance of 20 to 30 feet up the trunks, presumably following the cambium layer. These sporophores are allowed to ripen and produce myriads of spores, which will be distributed by wind, insect, or other agency, and infect other trees if perchance the spores alight in a wound or crack in the bark, or on the unprotected end of a broken branch. One living beech was attacked by a *Pleurotus* on one side and *Fomes fomentarius* on the other. *Armillaria mellea* is also at work, and in the park *Pholiota squarrosa* is attacking many of the fine ashes in great force. Other tree diseases seen in the district and more or less plentiful were *Fomes annosus*, on pine stumps; *F. igniarius*, on plum and other trees; *Polyporus hispidus* on ash trees in hedge-rows; *Polyporus betulinus*, on birches; *Fistulina hepatica*, on oaks; *Hirneola auricula-judæ*, on elder (in one place only, between Rievaulx and Duncombe Park); and *Nectria cinnabarina*, on young horse-chestnut. The latter had killed a nine or ten years old tree, the end one in a row planted by the beck side in High Street, February 1898; the next one above is also affected and doomed; the disease appears in the form of 'bright coral-like warts about the size of a millet seed' thickly studding the surface of the bark; this fungus also flourishes freely on both living and dead branches of beech, sycamore, lime, etc. Beech appears to be its favourite host or habitat. *Exoascus deformans* was noted on plum trees.

One feature of the meadows and pastures was the immense quantity of *Hygrophorus* sp., notably, *niveus*, *pratensis*, and *puniceus*, the latter occasionally four to five inches across, an unusual size. As will be seen by the list, many others of this genus were noted; *eburneus* was common in the woods; a few specimens of *sciophanus* were found in the 'common' pasture south of the town. *Hygrophorus melizeus*, a well-marked, straw-coloured, thin species, brought by Philip Sheppard, and party from Rievaulx, constitutes a new British record. *Marasmius lagopinus*, picked up by Needham and Thwaites, is also new to Britain.

A deep-blue *Entoloma*, collected by John Farrah from near the temple on the terrace overlooking Rievaulx Abbey, proves to be new to science. On a casual examination it was taken to

be *Entoloma ardosiacum*; a closer inspection, however, showed the spores to be elliptical and smooth. This, and other points, separate it from its nearest allies, *E. ardosiacum* (Bull.) and *E. Bloxami* B.&Br., both of which have globose-nodulose spores; neither does it agree with any other known species. It will henceforth be known as *Entoloma Farrahi*, after its discoverer.

It is hoped that descriptions and figures of all new species recently found in Yorkshire will appear in this journal shortly.

The above three discoveries at one foray emphasize the fact that our knowledge of the British Fungus Flora is as yet far from complete. It may also be mentioned that in connection with the Exhibition of Fungi organised by the Royal Horticultural Society a visit was paid to Epping Forest by G. Massee, A. Clarke, and the writer. Among the numerous interesting species there observed Mr. Clarke picked up *Collybia planipes* Brig., another species new to Britain.

All through the foray there was an almost entire absence of the ordinary mushroom. Horse mushrooms, *Agaricus arvensis*, were reported in plenty in Riccaldale; *Melanosporæ* generally were rarest. On the contrary, *Cortinarii* have been much commoner than usual; also the genus *Tricholoma*.

The following species were noticed growing in rings or segments of rings:—*Marasmius oreades*, of course; *Clitocybe geotropa*, in the park; *C. nebularis*, in a moist grassy place towards the margin of an open portion of the beech wood adjoining the park; *Hygrophorus niveus*, in pastures; *Hydnum repandum*, in the beech wood. Not a single specimen of *Amanita muscaria* was met with. A new feature to us was the quantity of *Clavariæ*, both woodland and pasture species.

The beautiful *Helotium citrinum* was exceedingly common on moist, partially decayed, fallen branches, and appeared to select branches not less than 1 to 1½ inches diameter. The short grass on the terrace at Rievaulx was thickly studded with *Mitrule viride*. *M. olivacea* was also found in plenty on moist mossy banks in the opener parts of the beech wood.

The routes laid down in the circular for the various days, viz., Duncombe Park and Woods, Beckdale, and Ashdale, were not strictly adhered to. The glowing accounts from Rievaulx caused that place to be substituted for Ashdale on the Wednesday, one of the objects being to try and find more of *Entoloma Farrahi*. A rare *Scleroderma*, *S. geaster*, and a few other interesting species rewarded this extra visit.

At the Y.N.U. meeting at Helmsley, August 1884, *Pluteus ephebius* was found and formed a first British record. The same species has been met with again this time.

All the species except those from Rievaulx were gathered within a mile of Helmsley, consequently it is not considered necessary to name each particular locality. A wooded corner of Duncombe Park was visited each morning before breakfast by Needham and Thwaites with excellent results.

We are much indebted to Mr. H. Slater, the very able schoolmaster, for making arrangements for the visit, and for advice as to the most suitable places to investigate. Mr. Slater has also sent the writer about 130 species during the summer, 44 of which were not seen during the foray, as they appear earlier in the season; these are marked in the list with an asterisk. The total number, including the two species new to Britain and one new to science, is 430; fifteen are new Yorkshire records. There are fewer micro-species than usual. Prof. Atkinson's interest being almost entirely concentrated on the Agaricaceæ, this group received most attention from the members present on that account, hence the smaller forms, which usually receive special notice, were somewhat neglected. However, it was a pleasure, when parting time came, to hear the Professor express himself as being most highly satisfied in every way with the results of his visit. Sweden, Germany, and France are the other European centres where he intends comparing mycologists' interpretations of species.

Consignments of fungi were forwarded by the President of the Union from Malham; A. R. Warnes, M.S.C.I., Hull; J. H. Holland, F.L.S., Ryde, Isle of Wight; and H. Mellor, Nether Thong. J. Needham brought a quantity from Hebden Bridge, and W. A. Thwaites from Masham. Atmospheric conditions were upon the whole favourable. Rain fell during the evenings and night-time; collecting was interrupted on one day only, and then but three of the party returned to shelter; these, however, made good use of the time by overhauling specimens on the table that might otherwise have been neglected and wasted; the remainder braved the elements and justified their pluck by returning with well-filled baskets. Conditions for a fungus foray were, as Mr. Slater's forecast stated, 'ideal.'

Three of the papers announced on the circular, viz.:— 'Bacteria in their Relation to the Higher Plants,' by G. Masee, F.L.S., V.M.H., President of the section; 'Some Recently Noticed Coprophilous Fungi,' by Thos. Gibbs; and

'A Demonstration of Some Methods of Preparing Illustrations of Fungi,' by A. Clarke, were given. Mr. Cotton was unavoidably prevented from attending the meeting, but a short abstract of his paper on 'Pure Cultures of Fungi from Orchid Mycorrhiza' will be printed, also J. H. Holland's continuation of his paper on 'Economic Fungi,' the first portion of which was given last year at Egton Bridge. On the Saturday evening Mr. Massee gave an interesting informal talk, illustrated by large coloured drawings, showing that in many cases what have been considered as entities are, in reality, only separate stages in the life-cycle of one fungus. He dealt specially with a *Nectria* and its Hyphomycete forms, which attack and rot potatoes stored in 'pies' and other places for keeping.

A number of photographs, stereoscopic and other, and coloured drawings of fungi, were exhibited.

Mr. Massee was re-elected President, and C. Crossland Secretary, with a Committee of seven, for the coming year, viz., Rev. W. Fowler, Messrs. W. N. Cheesman, A. Clarke, A. D. Cotton, Thos. Gibbs, J. W. Sutcliffe, and H. W. T. Wager, F.L.S.

It was decided to recommend to the Executive Upper Teesdale as the place of meeting for 1904 (24th-29th September). The main reason for recommending this somewhat out-of-the-way district is that no fungus foray has hitherto been held in North-west Yorkshire.

A hearty vote of thanks was accorded to Lord Feversham for allowing the members the privilege of visiting his estates.

H. = Helmsley. R. = Rievaulx. * = Collected by Mr. Slater, prior to the foray.

BASIDIOMYCETES.

(GASTROMYCETES.)

Sphærobolus Tode.

S. stellatus H.

On rotting wood.

Lycoperdon Tournf.

L. saccatum Vahl. H.

L. gemmatum Batsch. H., R.

L. pyriforme Schæff. H., R.

L. bovista L.

In pasture.

**L. nigrescens* Vitt. H.

In pasture.

Scleroderma Pers.

S. vulgare Fr. H., R.

S. verrucosum Pers. R.

S. geaster Fr. R.

Ithyphallus Fr.

I. impudicus (L.) H., R.

(HYMENOMYCETES.)

AGARICACEÆ.

Agariceæ.

Leucosporæ.

Amanita Pers.

A. virosa Fr. H.

A. phalloides Fr. H., R.

**A. pantherina* (DC.) Fr. H.

***Amanita excelsa** Fr. H.

A. rubescens (Pers.) Fr. H.

Amanitopsis Roze.

A. vaginata (Bull.) H., R.

Form fulva Schæff. H.

Lepiota Fr.***L. procera** (Scop.) H.

L. rachodes (Vitt.) R.

L. excoriata (Schæff.) R.

L. Friesii (Lasch.) H.

L. acutesquamosa (Weinm.) H.

L. hispida (Lasch.) R.

L. cristata (A.&S.) H., R.

L. carcharia (Pers.) H., R.

L. cinnabarina (A.&S.) H.

L. granulosa (Batsch.) H., R.

L. amianthina (Scop.) H.

Armillaria Fr.

A. mellea (Vahl.) H., R.

Common on various trees.

A. mucida (Schr.) H.

On living beech trees.

Tricholoma Fr.

T. resplendens Fr. H.

On the ground in beech wood.

T. spermatium Fr. H.

T. acerbum (Bull.) R.

T. albobrunneum (Pers.) R.

T. ustale Fr. H.

T. stans Fr. H.

T. rutilans (Schæff.) R.

T. vaccinum (Pers.) Near R.

On the ground in fir wood.

T. murinaceum (Bull.) H.

T. terreum (Schæff.) H., R.

Common in beech and other woods.

T. saponaceum Fr. H.

T. sulphureum (Bull.) H., R.

T. inamcenum Fr. H.

T. carneum (Bull.) H.

In pasture.

T. album (Schæff.) R.

T. personatum Fr. H., R.

T. nudum (Bull.) R.

T. panæolum Fr. H.

T. grammopodium (Bull.) H.

T. melaleucum (Pers.)

Var. polioleucum Fr. H.

T. sordidum Fr. R.

T. pædidum Fr. H.

T. lixivium Fr. R.

Clitocybe Fr.

C. nebularis (Batsch.) H.

In beech wood, in a ring, among dead leaves.

C. cerussata Fr. H.

C. fumosa (Pers.) R.

C. pergamena Ck. H.

C. maxima Fr. H., R.

C. geotropa (Bull.) H., R.

In park in segment of a ring.

C. inversa (Scop.) R.

C. brumalis Fr. H., R.

***C. laccata** (Scop.) Kirkdale, H., R.

Var. amethystina Bolt. R.

Collybia Fr.

C. radicata (Bull.) H., R.

C. platyphylla Fr. H.

C. fusipes (Bull.) H.

C. maculata (A.&S.) H., R.

C. butyracea (Bull.) H., R.

C. velutipes (Curt.) R.

C. confluens (Pers.) R.

C. tuberosa (Bull.) H., R.

C. acervata Fr. H.

C. dryophila (Bull.) H., R.

Mycena Pers.

M. pura Pers. H.

M. pseudopura Ck. H.

M. flavoalba Fr. H.

M. lactea (Pers.) H.

M. rugosa Fr. H.

On dead trunk.

M. galericulata (Scop.) H., R.

Common on stumps.

Var. calopoda Fr. H., R.

On stumps.

M. polygramma (Bull.)

M. pullata B.&Cke. H.

M. alcalina Fr. H.

M. ammoniac Fr. R.

M. filopes (Bull.) H.

***M. amicta** Fr. Kirkdale.

Among moss.

M. acicula (Schæff.) H.

M. hæmatopoda Fr. H.

On dead branches.

M. sanguinolenta Fr. H., R.

M. galopoda Fr. H.

Among dead twigs, etc., in woods.

M. epipterygia Fr. H., R.

In pasture and open wood.

M. tenerrima B. R.

On larch twigs.

M. corticola (Schum.) H.

M. capillaris (Schum.) H., R.

Omphalia Fr.

O. umbellifera (L.) H.

O. fibula (Bull.) Kirkdale, H., R.

O. bullula Brig. H.

Pleurotus Fr.

P. dryinus (Pers.) H.

P. ulmarius (Bull.) R.

**P. lignatilis* Fr. H.

**P. mitis* (Pers.) H.

P. tremulus (Schæff.) H.

**P. septicus* Fr. Kirkdale, H.

P. cyphellæformis (B.) R.

Rhodosporeæ.

Pluteus Fr.

P. cervinus (Schæff.) H., R.

On and about rotting stumps.

P. ephedrus Fr. H.

On rotting stump.

Entoloma Fr.

E. lividum (Bull.) H.

E. prunuloides Fr. H.

E. helodes Fr. H.

E. Farrahi Mass. & Crossl. Sp. nov.

Among grass on the terrace overlooking Rievaulx Abbey.

E. sericellum Fr. H., R.

E. sericeum (Bull.) H., R.

E. nidorosum Fr. H.

E. speculum Fr. H.

Clitopilus Fr.

C. prunulus (Scop.) H.

Leptonia Fr.

L. lampropoda Fr. H.

L. incana Fr. H.

L. asprella Fr. R.

Nolanea Fr.

N. pascua (Pers.) H., R.

In pastures.

N. mammosa (L.) H.

In pasture.

Eccilia Fr.

E. rhodocylix (Lasch.) H.

Ochrosporeæ.

Pholiota Fr.

P. squarrosa Mull. H., R.

At the base of live ash trees.

Var. *Mulleri* Fr. H.

P. mutabilis (Schæff.) H., R.

Common about dead stumps.

P. marginata (Batsch.) H.

P. unicolor (Fl. Dan.)

Inocybe Fr.

I. lanuginosa (Bull.) H.

I. pyriodora (Pers.) H., R.

I. mutica Fr. H.

I. rimosa (Bull.) H., R.

**I. asterospora* (Quel.) H.

I. geophylla (Sow.) H., R.

Common among grass on the margins of woods.

Hebeloma Fr.

H. sinapizans Fr. H., R.

H. crustuliniforme (Bull.) H., R.

Common in the woods.

H. longicaudum (Pers.) R.

Flammula Fr.

F. alnicola Fr. H.

F. hybrida Fr. H.

F. sapinea Fr. H., R.

Naucoria Fr.

N. badipes Pers. H.

N. temulenta Fr. H.

Galera Fr.

G. tenera (Schæff.) H., R.

In pastures.

G. sparteae Fr. H.

G. hypnorum (Batsch.) H., R.

Common among moss.

Tubaria Sm.

T. muscorum (Pers.) H.

Among moss.

Crepidotus Fr.

C. mollis (Schæff.) H.

Bolbitius Fr.

B. flavidus Bolt. H.

B. fragilis Fr. H.

In rich pasture.

B. titubans (Bull.) R.

In pasture.

B. conocephalus (Bull.) R.

Cortinarius Pers.

C. (Phlegmacium) varius

(Schæff.) H.

C. (Phleg.) cyanopus Fr. H.

C. (Phleg.) largus Fr. H.

C. (Phleg.) russus Fr. H.

C. (Phleg.) purpurascens Fr.

Var. *subpurpurascens*

(Batsch.) H.

- Cortinarius* (*Myxaciium*) *elator* Fr. H.
C. (*Inoloma*) *hircinus* Fr. R.
C. (*Inol.*) *pholideus* Fr. R.
C. (*Dermocybe*) *ochroleucus* (Schæff.) H.
C. (*Derm.*) *decumbens* (Pers.) H.
C. (*Derm.*) *camurus* (Bull.) H.
C. (*Derm.*) *caninus* Fr. H.
C. (*Derm.*) *sanguineus* Fr. R.
C. (*Derm.*) *cinnamomeus* (L.) R.
C. (*Derm.*) *orellanus* Fr. H.
C. (*Telamonia*) *torvus* Fr. H.
C. (*Tela.*) *evernius* Fr. R.
C. (*Tela.*) *hinnuleus* Fr. R.
C. (*Tela.*) *hemitrichus* Fr. H.
C. (*Tela.*) *rigidus* Fr. H., R.
C. (*Tela.*) *paleaceus* Fr. H.
C. (*Hydrocybe*) *saturninus* Fr. H.
C. (*Hygr.*) *bicolor* Cke. R.
C. (*Hygr.*) *leucopus* (Bull.) H.
C. (*Hygr.*) *detonsus* Fr. H.
C. (*Hygr.*) *acutus* (Pers.) R.
McInanosporæ.
Agaricus L.
A. *angustus* Fr. R.
A. *arvensis* Schæff. H., R.
A. *campestris* L. H., R.
 Var. *silvicola* Vitt. R.
A. *silvaticus* Schæff. H.
Stropharia Fr.
S. *æruginea* (Curt.) H., R.
S. *albocyanæa* (Desm.) R.
S. *stereoraria* Fr. H., R.
S. *semiglobata* (Batsch.) H., R.
Hypholoma Fr.
H. *sublateritium* (Schæff.) R.
H. *capnoides* Fr. R.
H. *fascicularis* (Huds.) H., R.
Panæolus Fr.
P. *phalænarum* (Bull.) H.
P. *campanulatus* (L.) H., R.
**P.* *papilionaceus* (Bull.) H.
Anellaria Karst.
A. *separata* (L.) H., R.
Psilocybe Fr.
P. *sarcocephala* Fr. R.
P. *semilanceata* Fr. H., R.
P. *spadicea* Fr. H.
P. *fœnisecii* (Pers.) H., R.
Psathyra Fr.
**P.* *conopilea* Fr. H.
P. *spadiceogrisea* (Schæff.) H.
P. *pennata* Fr. H.
Psathyrella Fr.
P. *subatrata* Fr. H.
P. *gracilis* Fr. Eastmoor, H.
P. *disseminata* (Pers.) H., R.
P. *atomata* Fr. H., R.
Coprinus Pers.
C. *comatus* Fr. H.
C. *ovatus* (Schæff.) H.
C. *atramentarius* Fr. H., R.
C. *niveus* Fr. H.
C. *micaceus* (Bull.) H., R.
C. *lagopus* Fr. H.
C. *radiatus* (Bolt.) H., R.
**C.* *ephemerus* Fr. H.
C. *plicatilis* (Curt.) H., P.
Gomphidius Fr.
**G.* *gracilis* Berk. H.
Paxilleæ.
Hygrophorus Fr.
H. *eburneus* (Bull.) H., R.
H. *melizeus* Fr. R.
 First British record.
H. *glutifer* Fr. R.
H. *pratensis* (Pers.) H., R.
H. *virgineus* (Wulf.) H., R.
H. *niveus* (Scop.) H., R.
H. *sciophanus* Fr. H.
H. *lætus* Fr. H.
H. *coccineus* (Schæff.) H., R.
H. *miniatus* Fr. H., R.
H. *puniceus* Fr. H., R.
H. *obrusseus* Fr. H.
H. *conicus* (Scop.) R.
H. *calyptræformis* Berk. H., R.
H. *chlorophanus* Fr. H.
H. *psittacinus* (Schæff.) H., R.
H. *unguinus* Fr. R.
H. *nitratu*s (Pers.) H.
Paxillus Fr.
P. *lepista* Fr. R.
P. *involutus* (Batsch.) H., R.
Lactariææ.
Lactarius Pers.
L. *turpis* (Weinm.) H.
L. *blennius* Fr. H., R.
L. *pyrogalus* (Bull.) H.
L. *chrysorrheus* Fr. R.
L. *pergamenus* Fr. H.
L. *vellereus* Fr. H.



MYCOLOGISTS AT HELMSLEY.—HELPERS.

A. G. ROBERTSHAW. C. H. BROADHEAD.

JOHN WM. FARRAH. W. A. THWAITES. J. NEEDHAM.

**L. deliciosus* L.

Kirkdale and Eastmoor.

L. pallidus Pers. R.

L. quietus Fr. H., R.

L. glyciosmus Fr. H., R.

L. volemus Fr. H.

L. subdulcis Bull. H., R.

**L. camphoratus* Fr. H.

L. subumbonatus Lind. H.

Russula Pers.

R. nigricans Bull. H., R.

R. densifolia Secr. H.

R. semicrema Fr. R.

**R. chloroides* Kromb. H.

R. purpurea Gillet. H.

R. cutefracta Cke. R.

**R. vesca* Fr. H.

R. cyanoxantha Schæff. H., R.

R. emetica Fr. H., R.

R. ochroleuca Fr. H., R.

R. granulosa Cke. H.

R. fragilis Pers. H.

**R. integra* Fr. H.

R. armeniaca Cke. H., R.

R. puellaris Fr. H.

R. lutea Fr. R.

Cantharellæ.

Cantharellus Pers.

C. cibarius Fr. H., R.

C. tubæformis Fr. H., R.

C. infundibuliformis Fr. H.

**C. aurantiacus* Fr. Eastmoor, H.

Nyctalis Fr.

N. parasitica Fr.

Marasmiæ.

Marasmius Fr.

M. peronatus (Bolt.). H., R.

M. oreades (Bolt.). H., R.

M. plancus Fr. R.

M. fuscopurpureus (Pers.). R.

M. Vaillantii Fr. H.

M. lagopinus Fr. H.

First British record.

M. ramealis (Bull.). H., R.

M. rotula (Scop.). H.

M. androsaceus Fr. H., R.

M. splachnoides Fr. R.

Lenziteæ.

Lenzites Fr.

L. flaccida Bull. R.

POLYPORACEÆ.

Boleteæ.

Boletus Dill.

**B. luteus* L. Eastmoor.

**B. flavus* With. H.

B. chrysenteron Fr. Kirkdale,
H., R.

**B. subtomentosus* L. H.

**B. variegatus* Swartz.
Eastmoor, H.

B. badius L. H., R.

**B. edulis* Bull. Kirkdale.

B. felleus Bull. R., H.

B. laricinus Berk. H.

B. scaber Fr. Eastmoor, R.

Fistulina Bull.

F. hepatica Fr. H., R.

Polyporeæ.

Polyporus Mich.

**P. fuscidulus* Fr. H.

P. squamosus Fr. H., R.

P. varius Fr. H.

P. giganteus Fr. H.

P. dryadeus Fr. H., R.

P. hispidus Fr. H.

P. crispus Fr. R.

P. nidulans Fr. H.

P. betulinus Fr. H., R.

P. adustus Fr. H.

P. chioneus Fr. H., R.

P. cæsius Fr. R.

Fomes Fr.

F. ulmarius Fr. R.

F. igniarius Fr. H., R.

F. annosus Fr. H., R.

F. ferruginosus Mass. H., R.

Polystictus Fr.

P. versicolor Fr. H., R.

P. hirsutus Fr. H.

Poria Pers.

P. vaporaria H., R.

P. blepharistoma B. & Br. H.

Trametes Fr.

T. suaveolens Fr. R.

Dædalea Pers.

D. quercina Pers.

D. confragosa Pers.

On birch.

HYDNACEÆ.

Hydnum L.

H. repandum L. H., R.

Hydnum alutaceum Fr. H.
H. niveum Pers. H., R.

CLAVARIACEÆ.

Clavaria Vaill.
C. fastigiata L. H.
C. muscoides L. H., R.
C. cinerea Bull. H., R.
C. cristata Holmsk. H., R.
C. rugosa Bull. H., R.
C. Kunzei Fr. R.
C. spinulosa Pers. H., R.
C. fusiformis Sow. H., R.
C. dissipabilis Britzl. H.
C. vermicularis Scop. H., R.
C. fumosa Pers. H., R.
C. ligula Fr. H.

Typhula Pers.

T. erythropus Fr. H.

Pistillaria Fr.

P. quisquiliaris Fr. H.

THELEPHORACEÆ.

Craterellus Fr.
C. cornucopioides Pers. H., R.

Stereum Pers.

S. hirsutum Fr. H., R.

S. sanguinolentum Fr. H.

S. spadiceum Fr. H.

Corticium Fr.

C. sebaceum (Berk.). H.

C. comedens Fr. R.

Hymenochæte Lév.

H. rubiginosa Lév. R.

Cyphella Fr.

C. capula Fr. H.

Thelephora Ehrh.

T. laciniata (Pers.). H.

TREMELLACEÆ.

Hirneola Fr.

H. auricula-judæ Berk. R.

Exidia Fr.

E. glandulosa Fr. R.

E. albida Brefeld. R.

Tremella Dill.

**T. lutescens* Pers. H.

T. mesenterica Retz. R.

Calocera Fr.

C. viscosa Fr. H., R.

C. cornea Fr. H., R.

Dacryomyces Nees.

D. deliquescens Duby. H.

D. stillatus Nees. H., R.

UREDINACEÆ.

Melampsoreæ.

Melampsora Cast.

M. helioscopiæ (Pers.). H.

On *Euphorbia peplus* in garden.

M. farinosa (Pers.). R.

On *Salix caprea*.

Coleosporium Lév.

C. sonchi (Pers.). H., R.

On *Tussilago farfara*.

Puccineæ.

Uromyces Link.

**U. poæ* Rabh.

On *Ran. ficaria*. May.

**U. alchemillæ* (Pers.). H.

On *Alchemilla vulgaris*. May.

Puccinea Pers.

P. menthæ Pers. H.

On garden mint.

P. saniculæ Grev. R.

On *Sanicula europæa*.

P. hieracii (Schum.). R.

**P. betonicæ* (A.&S.). H.

On *Stachys betonica*. July.

P. bunii DC. H.

On *Bunium flexuosum*. May.

P. veronicæ (Schum.). R.

On *Veronica montana*.

P. malvacearum Mont. R.

P. glechomatis D.C. R.

On *Nepeta glechoma*.

USTILAGINACEÆ.

Urocystis Rabh.

**U. anemones* (Pers.). H.

On *Anemone nemorosa*. May.

ASCOMYCETES.

(PYRENOMYCETES.)

Sphærotheca Lév.

S. pannosa Lév. H.

Sphærella C.&D.

S. rumicis Desm. H.

Sordaria C.&DeN.

**S. curvula* DeBary. H.

**S. fimicola* (Rob.). H.

Xylaria L.

X. hypoxylon L. H., R.

X. polymorpha Grev. R.

Eutypa Tul.

E. lata Tul. H.

Phyllachora Fekl.

P. graminis Fekl. H.

Nectria Fr.

N. cinnabarina Fr. H., R.

***Epichloë** Pers.

E. typhina Pers. H. July.

Claviceps Tul.

C. purpurea Tul. H.

On *Lolium perenne*.**(DISCOMYCETES.)****HELVELLACEÆ.****Morchella** Dill.

*M. esculenta Pers. H. May.

Leotia Hill.

L. lubrica Pers. H., R.

Helvella L.

H. crispa Fr. H., R.

H. lacunosa Afz. R.

Mitrula Fr.

M. viride Karst. R.

M. olivacea (Pers.). H.

Geoglossum Pers.

G. glabrum Pers. R., H.

PEZIZACEÆ.**Peziza** Dill.

*P. repanda Wahl. H. May.

P. pustulata Pers. H.

Otidea Pers. (in part).

O. leporina (Batsch.). H.

O. phlebophora (B.&Br.). R.

O. alutacea (Pers.). H.

O. aurantia (Pers.). R.

Humaria Fr.

H. granulata (Bull.) Sacc. H., R.

Lachnea Fr.

L. coprinaria (Cke.).

L. scutellata (L.). H., R.

L. hemispherica (Wigg.).

Sclerotinia Fekl. H.

*S. tuberosa (Bull.). H. May.

On *Anemone nemorosa* bed in
woodland part of Duncombe
Park. Where the fungus was
growing there were plenty

anemone rhizomes, but none
had sent up either a leaf- or
flower-stalk.

Helotium Fr. (in part).

H. claroflavum (Grev.). H.

H. ferrugineum (Schum.). H.

H. lenticulare (Bull.). H.

H. citrinum (Hedw.). H., R.

H. moniliferum (Fekl.). H., R.

H. cyathodeum (Bull.). H., R.

H. scutulum (Pers.). H.

H. renisporium Ellis. H.

H. fagineum (Pers.). R.

Chlorosplenium Fr.

C. æruiginosum CEd. H., R.

Mollisia Fr.

M. cinerea (Batsch.). H.

Dasyscypha Fr.

D. virginea (Batsch.). H.

D. nivea (Hedw.). H., R.

D. calycina (Schum.). R.

Belonidium M.&D.

B. Clarkei Mass.&Crossl.

*B. pruinosum (Jerd.).

ASCOBOLACEÆ.**Ascophanus** Boud.

*A. minutissimus Boud. H.

*A. equinus (Müll.). H.

Ascobolus Pers.

A. furfuraceus Pers. H., R.

A. immersus Pers. H.

Saccobolus Boud.

*S. depauperatus (B.&Br.). H.

BULGARIACEÆ.**Coryne** Tul.

C. sarcoides (Jacq.). H., R.

PHACIDIACEÆ.**Rhytisma** Fr.

R. acerinum (Pers.). H., R.

HYSTERIACEÆ.**Gloniopsis** DeN.

G. curvata (Cke.). H.

PHYCOMYCETES.**MUCORACEÆ.****Mucor** Mich.

*M. mucedo L. H.

Spinellus Van.T.

S. fusiger. H., R.

Syzygites Ehrh.*S. megalocarpus* Ehrh. H.**Pilobolus** Tode.*P. crystallinus* Tode. H., R.**CYSTOPODACEÆ.****Cystopus** Lév.*C. candidus* Lév. H.**PERONOSPORACEÆ.****Phytophthora** DeBary.*P. infestans* DeBary. H.**DEUTEROMYCETES.****SPHÆRIOIDACEÆ.****Phyllosticta** Pers.*P. ruborum* Sacc. H.

On living bramble leaves.

Septoria Fr.*S. rosarum* West. H.

On living wild rose leaves.

HYPHOMYCETEÆ.**Botrytis** Mich.*B. fascicularis*. H., R.**Sepedonium** Link.*S. chrysospermum* Fr. H., R.**Isaria** Pers.*I. farinosa* Fr. H.**MYXOMYCETES.****Fuligo** Hall.**F. varians* Somm. H.**Leocarpus** Link.*L. fragilis* Rost. H.**Spumaria** Pers.*S. alba* DC. H.**Stemonitis** DeBary.*S. Friesiana* DeBary. H.**Tubulina** Pers. (in part).*T. cylindrica* (Bull.). H.**Trichia** Hall.*T. fallax* Pers. H.*T. varia* Rost. H.**Arcyria** Hill (in part).*A. punicea* Pers. H.*A. incarnata* (Pers.). H.**Lycogala** Mich.**L. epidendron* Rost. H.**FLOWERING PLANTS.**

Late Flowering of the Elder.—On Saturday last, 10th October, I saw in the open near Mirfield a large and tall Elder bush (*Sambucus nigra*) in full bloom. This seems very unusual at such a time. I never remember the forest trees generally to look so fresh and green in leaf at this time of the year as now; some of the oaks especially look almost as bright and clean as in July, consequent, no doubt, on the cold and wet summer.—GEO. T. PORRITT, Huddersfield, 14th October 1903.

Plants at Claxby Wood.—On the occasion of the visit of the Lincolnshire Naturalists' Union to Claxby Wood (Div. 7), on the 31st of July 1903, about two hundred species and varieties of plants were noted, of which the following are the best:—*Berberis vulgaris*, two or three bushes in roadside hedge. *Stellaria uliginosa*, *Chrysosplenium oppositifolium*, and *C. alternifolium* were not seen on this visit, but taken in April last. *Geum urbanum* × *rivale*, *Lycopsis*, *Myosotis sylvatica*, *Hyoscyamus*, *Veronica montana*, *Dipsacus pilosus*, *Equisetum maximum*.—E. ADRIAN WOODRUFFE PEACOCK, Cadney, Brigg, 8th August 1903.

ON THE PRESERVATION OF MARINE ANIMALS.

H. C. SORBY, LL.D., F.R.S., ETC.,

Sheffield.

THOUGH for some years I have been appointed Chairman of the Section of Marine Biology of the Yorkshire Naturalists' Union, I have so far done nothing to advance its objects. This is not because I have taken no interest in the subject, but because at the time of our meetings I am residing on my yacht occupied with marine studies in a distant part of the country. The following is a short account of the sort of work I have been carrying on for many years, and possibly some of our readers may find portions of it a suitable study for themselves.

About twenty years ago my attention was directed mainly to the determination of the number per gallon of the various free swimming animals and plants in both fresh and salt water. At that time so little notice was taken of this kind of work that I did not continue it for more than a few years; but, since then, very much attention has been directed to such organisms under the name of plankton; though often more with relation to the nature of the material than to the number of the organisms per gallon. I have lately been engaged in collecting together and discussing all my observations, hoping soon to publish full particulars, since the results seem to be of much interest.

Nearly fifteen years ago it occurred to me that it would be possible to dry marine animals on glass and mount them in Canada balsam to be used as lantern slides. I have thus prepared a good many hundred specimens, belonging to nearly all those groups of marine organisms which are not too large or too small for the purpose. In some cases great difficulties had to be overcome before satisfactory results could be obtained, but by perseverance nearly all have been overcome, so that in many cases not only the form and colour but even much of the anatomical structure can be seen when they are used in a lantern. In most cases the natural colour has not sensibly faded in a dozen years when so kept as not to be exposed to strong daylight. There are, however, cases in which the structure is better seen by destroying some generally diffused pigment by the action of strong sunlight, and leaving another which shows important detail. I cannot now enter into par-

ticalars, since nearly every animal requires special treatment, and what is desirable in one case would be ruinous in another. Animals thus mounted as lantern slides form admirable museum specimens, and I have a collection of about 85 species, illustrating the fauna of the Thames estuary, arranged over white paper in a series of shallow trays and drawers, so as to form a very compact and ornamental museum, showing many facts far better than specimens preserved in alcohol or formalin; and, besides this, they can be at once examined under a microscope with moderate powers, since it is possible to preserve much of the natural structure.

In 1899 it occurred to me that some animals might be kept to advantage in liquids of higher refractive power than alcohol, so that they might be more transparent, and the internal structure seen; and also that some liquid might be found which does not dissolve out or destroy the natural colours like alcohol or formalin do. This has led me into a wide field of research, since it has involved many experiments with colouring matters, and the study of the action on them of light, with or without the combined influence of air. The difference in the behaviour of different coloured animals in different liquids has been found very remarkable, and, though the colours are often faded by light, yet in a few cases they are altered in tint and actually made darker. So far the chief liquids employed have been undiluted glycerine and a concentrated solution of lump sugar. What is wanted is some preservative liquid which has no solvent power for the colouring matters or chemical action on them. In many cases undiluted glycerine has given most excellent results, though its affinity for water is somewhat too strong. Animals which soon become nearly white in alcohol or formalin have retained their colour more or less perfectly for some years when not exposed to strong sunlight, and, in some cases, even when exposed to it as much as possible. A few, but only a few, pigments fade even when kept in the dark, but what is remarkable and requires further study is that in the case of some crustacea a deep red or orange pigment is developed, or at all events made apparent. In some species this occurs when they are kept in a concentrated solution of sugar, but in others does not, so that the animals remain as when alive, but fade in alcohol or formalin and become too dark and falsely coloured in glycerine. For this reason syrup is very good, but it sometimes ferments or turns mouldy in a very puzzling manner, owing to conditions which so far I have been unable to understand.

On the whole, the more I have studied the preservation of the natural colour of animals, the more complicated it seems to become. It is really a very special branch of chemistry, and I often feel that so much depends on what may seem a trifle, that a very simple thing may at any time change failure into perfect success. Though very much remains to be learned, yet in my collection I have many specimens showing the natural beautiful colours and looking as when alive, which have been kept for some years, whereas similar specimens preserved in the usual way became white and opaque in a few months, days, or even hours, according to the kind of animal or liquid used. The glycerine must, however, be undiluted, and the animals transferred to a fresh lot after they have lost their contained water, since its action is often quite different when any material amount of water is present.

In concluding this part of my subject, I ought to allude to the results of experiments made with the view of killing some animals in a fully-expanded condition. In many cases the use of menthol is remarkably satisfactory. Though so slightly soluble in sea water it gradually stupifies and kills most animals, and the chief difficulty is to know when they are really dead, so that when put into diluted formalin there is no vital contraction. Some Actiniæ and Chætopoda are good examples of this use of menthol. I have specimens of *Actinoloba dianthus* and *Tealia crassicornis* permanently preserved in formalin, as fully expanded as when alive, and similar specimens in concentrated glycerine retaining their natural colour. In some cases menthol is of no use, since the animals contract and die contracted. In a few instances fresh water is the best poison, but may cause abnormal swelling by diffusing into the tissues.

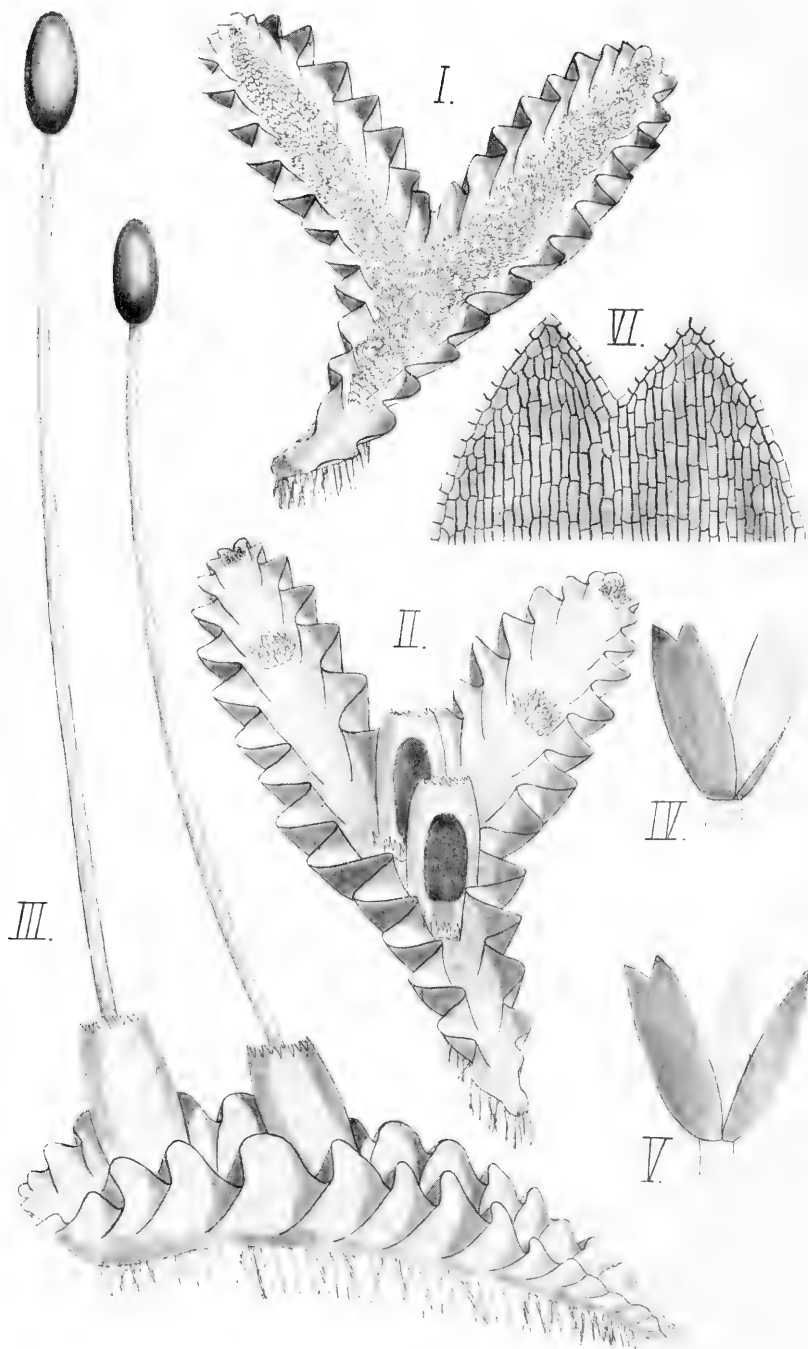
This year (1903) I have been much occupied in carrying out a new method for preparing marine worms as permanent microscopical objects, so as to show not only the larger arteries and veins but all the minute capillaries, filled with their own deep red blood. I had in years gone by partially succeeded in doing this, by quickly drying the specimens on glass, but in most cases the time required for drying was so long that many or even all the vessels were lost by decomposition. The plan I have lately found very successful is to get rid of the water, which amounts to about $\frac{7}{8}$ of the weight of the animals, by keeping them for a time in a concentrated solution of lump sugar. Into this the water rapidly diffuses, and, if they are not kept in it more than a day, there is no material back diffusion of the syrup, even

into the delicate pseudopodia. The adhering syrup is removed by blotting paper and by washing in concentrated glycerine, which is quickly removed by blotting paper, and the rest washed off by absolute alcohol, and the dry animal finally mounted in Canada balsam. Glycerine might be used instead of syrup, but gives rise to more objectionable back diffusion. I cannot pretend to describe all the necessary detail, which must to some extent vary with the particular species of worm, but I may say that, when all is properly carried out, surprisingly good objects can be obtained showing the most minute blood vessels, like exquisite injected preparations, and far better than when the animals are alive. The character of these vessels varies greatly in different genera, and there is a marked and characteristic difference in different species of the same genus. So far I have seen no reason to think that the specimens will deteriorate by keeping, since those made three months ago are as good or better than they were at first. I have applied this system to very few other animals than Annelids, but possibly some modification of it may turn out valuable in other cases by getting rid of all the contained water by diffusion under antiseptic conditions, without risk of decomposition.

I trust that what I have now described will, at all events, show that there is a wide field for research in connection with my subject outside the ordinary routine methods of biological study.

GEOLOGY.

Boulders at Ayton.—As I was recently walking up a lane which runs from East Ayton to Seamer Moor, the roadmen called my attention to a large boulder which had just been rolled out of an adjacent field, having been struck by the plough. I had it moved to my garden, and turned the hose on it, when it proved to be a fine mass of Shapfell granite (confirmed by Mr. P. F. Kendal). Its dimensions are about 20 × 18 × 12 in., and the men who moved it said it weighed over 20 stones. It occurred on rather high ground where an excavation made some years ago shows that about nine feet of glacial sands and gravels rest upon the Corallian rocks. I have not seen a large mass of Shapfell granite at Ayton before; basaltic boulders are the commonest, and fine grained granite also occurs, as well as one rich in iron pyrites.—W. C. HEY.



F. C., del.

Pallavicinia Flotowiana (Nees) Schiffner.

NOTES ON YORKSHIRE BRYOPHYTES.

II. *PALLAVICINIA FLOTOWIANA*.

F. CAVERS, B.Sc.

THE hepatic from Coatham Marshes which is described in the present note, and for numerous dried and fresh specimens of which I am indebted to the kindness of Mr. W. Ingham, is a *Pallavicinia* (sub-genus *Mörckia*). It agrees closely with *P. Flotowiana* (Nees) Schiffn. (syn. *P. Hibernica* Hook. var. *Wilsoniana* Carr.), but the following description, based on the writer's examination of a large number of plants, will be found to differ in some points from those given by Schiffner* and Warnstorf.† The plants grow in crowded patches on sandy soil. Each plant (Plate, I.-III.) is from 10 to nearly 30 mm. long and 3 to 5 mm. broad. The shoot or thallus branches dichotomously, but the forking takes place relatively seldom, usually once or twice only. There is a broad midrib, the posterior portion of which is bare and cylindrical, and which bears on its lower surface numerous whitish rhizoids. Anteriorly, the midrib bears on either side a broad thin wing which is sharply curved upwards at the margin and is thrown into numerous folds. This folding, which is usually fairly regular and gives the plant a neat, crisped appearance, is simply due to the more active growth of the marginal region of the wing; the margin itself usually remains entire, but is sometimes slightly lobed.

At the apex of each branch of the thallus there is a deep notch, the bottom of which is occupied by the growing point, consisting of a short transverse row of wedge-shaped initial-cells. From the ventral surface, immediately behind the row of initial-cells, there arise numerous filaments, each consisting of a single or partly double series of cells and ending in a club-shaped mucilage-cell, which curves upwards over the growing-point.

The posterior portion of the thallus, consisting of the cylindrical midrib, is roughly oval in cross-section, the dorsal surface being flattened and the ventral rounded. The midrib is from 15 to 20 cells in thickness, and on tracing forwards a series of

* Schiffner, V., 'Untersuchungen über *Mörckia Flotowiana* und über das Verhältniss der Gattungen *Mörckia* und *Calycularia* zu einander.' *Österr. Bot. Zeitschrift*, 1901.

† Warnstorf, C., 'Moose' in 'Kryptogamenflora der Mark Brandenburg,' p. 99.

cross-sections, the thin wing is seen to arise on either side as an expansion of the uppermost layers of cells of the midrib. The greater part of the wing consists of a single layer of cells, but where it joins the midrib it is usually several (2-4) cells thick. All the cells of the wing contain abundant chlorophyll grains. The same is the case with the upper epidermis of the midrib; chlorophyll is present in smaller quantity in the two or three layers immediately below this, but the greater part of the midrib consists of colourless tissue. The cells towards the upper surface of the midrib contain numerous starch-grains, whilst those nearest the lower surface are usually traversed by fungal hyphæ,

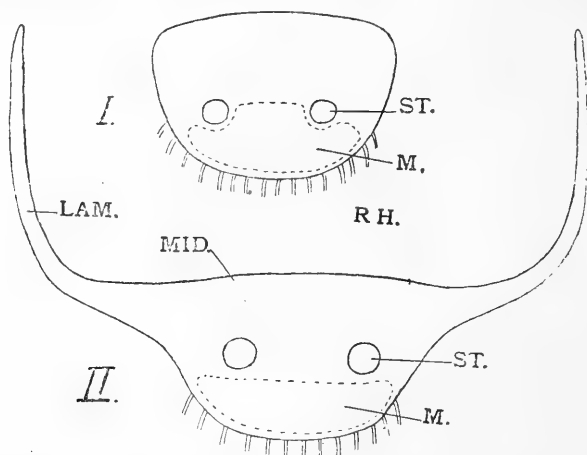


Fig. 1.—I. Transverse section through base of plant. II. Similar section taken further forwards. St., conducting strands of midrib; M., mycorrhizal zone; R.H., rhizoids; Lam., lamina or wing of thallus; Mid., midrib. $\times 25$.

forming a well-developed mycorrhizal zone (Fig. 1). Many of the cells of the ventral superficial layer grow out as long thin-walled colourless rhizoids, often containing fungal hyphæ which pass upwards into the compact tissue of the midrib.

The most interesting feature in the structure of the thallus is the presence in the midrib of two lateral strands, the function of which is that of conducting water, and which may be regarded as corresponding with the more highly differentiated strands found in other species of *Pallavicinia* (e.g., *P. Lyellii*). In an interesting paper published recently, Mr. Tansley* remarks: 'In specimens (of *P. hibernica*) from Hooker's type from Lough-

* Tansley, A. G., and Chick, Miss E., 'Notes on the Conducting Tissue-system in Bryophyta,' *Annals of Botany*, Vol. 15, 1901, p. 7.

bray, Co. Wicklow, and in specimens from Yorkshire, of quite different habit, which Mr. W. H. Pearson tells us agree with Gottsche's *Mörckia hibernica*, we have found the tissue of the midrib quite homogeneous without any trace of an axial strand. In another plant, however, kindly sent us by Mr. David McArdle, of the Royal Glasnevin Botanic Gardens, from sandy flats at Malahide, Co. Dublin, under the same name, but which he places under var. *Wilsoniana* Carrington, we find two distinct lateral strands in the midrib, each consisting, in transverse section, of about twenty cells, which do not differ from the

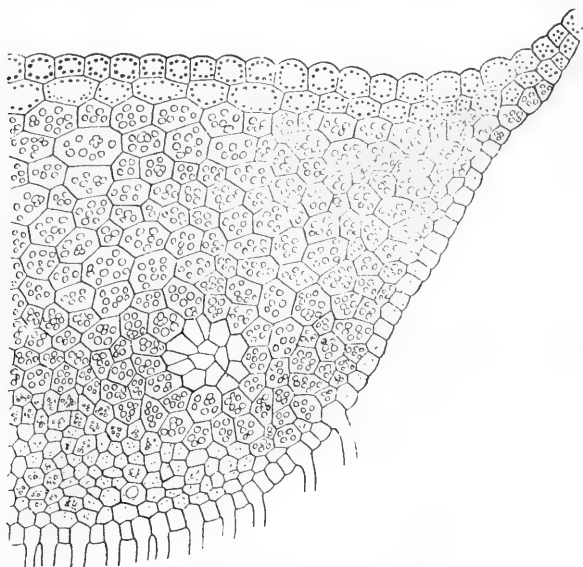


Fig. 2.—Part of Fig. 1., II., $\times 70$.

surrounding tissue in width or in the thickness of their walls. These walls, however, are distinctly brown in the unstained condition, and hold aniline stains more strongly than the surrounding tissue. On longitudinal section many of the strand-cells do not differ greatly from the neighbouring cells, but they tend to be longer, and some are of considerably greater length. . . . In the absence of living material on which to experiment we regard these strands as very primitive water-conducting channels.' In all the Coatham plants of which sections were examined, the midrib showed two lateral strands, corresponding in position with the strands described by Mr. Tansley in the Malahide specimens. In the Coatham plants, each strand

consists of about a dozen cells in cross-section, whilst on longitudinal section each cell is seen to be many times longer than wide (Figs. 2, 3). As a rule, these strand-cells give the reactions of lignified cell-walls, becoming deep-red when treated with phloroglucin, and yellow with aniline chloride, but in some cases the lignin-reactions are feeble or absent. The strand-cells are somewhat narrower than those of the surrounding tissue, from which they stand out clearly in sections. At first sight they appear to contain nothing but water, whilst the surrounding cells contain abundant starch-grains or sometimes densely-woven fungal hyphæ. Closer examination shows that each strand-cell is lined by a thin layer of protoplasm, which lies on the inner surface of the cell-wall, and is especially well seen

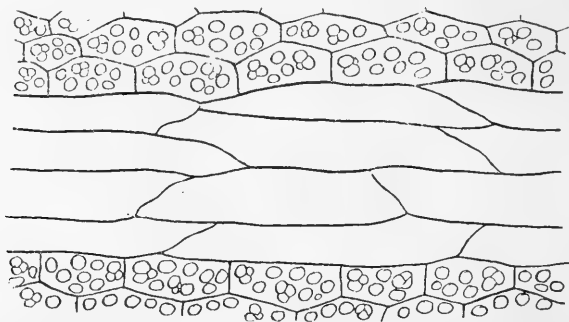


Fig. 3.—Part of a longitudinal section of the midrib, traversing one of the conducting strands. On either side of the elongated hyaline strand-cells are the cortical cells, packed with starch grains. $\times 180$.

when the cells are plasmolysed with salt solution. In the posterior portion of the midrib the strand-cells are usually found to be devoid of a nucleus, but further forwards, in the younger parts of the shoot, each strand-cell shows a large nucleus, generally ovoid or flattened and applied to the cell-wall; apparently the nuclei at a later stage become broken up and disappear.

In stained longitudinal sections, the lateral walls of the strand-cells show here and there areas of oval or rounded outline, where the membrane is very thin, and sometimes, especially in the bare hinder region of the midrib, actual openings or pores are seen. The cross-walls between the strand-cells are usually much thinner than the longitudinal walls, and are frequently perforated, so that the cells placed end to end are put in open communication.

(*To be continued.*)

REVIEWS AND BOOK NOTICES.



W. H. M. H.

EARTILY will all malacologists welcome the appearance of the second part of the second volume of Taylor's 'Monograph of the Land and Freshwater Mollusca of the British Isles,' which has just been published. The first volume dealt with the 'structural and general' aspect of the mollusca. The volume now appearing deals with the History, Diagnosis, Reproduction and Development, Food, Habits, Variation, and Geographical Distribution of each species. The particulars are remarkably complete, and the maps and illustrations add

still further to the value of the work. Mr. Taylor has also introduced the happy idea of illustrating his account of each



The Goyt Valley, near Whaley Bridge.

species with a view of a typical locality, and an initial letter with a portrait of some well-known conchologist. The block at the

beginning of this note represents a frequent contributor to these pages, and appears at the head of the description of *Limax arborum*. The second illustration is a well-known locality of *L. cinereo-niger*. An excellent coloured plate showing the varieties of *L. maximus* also appears in the part recently issued.

FIELD NOTES.

FUNGI.

Lifting Power of Fungi.—A case of the remarkable lifting power of fungi occurred at Harrogate during the month of September. I noticed a circular patch of asphalt about nine inches in diameter, situate in a footpath used by hundreds of people every day, but just outside the beaten track, to be raised considerably. Upon lifting off the crust of asphalt I was surprised to find the cause to be a cluster of *Coprinus atramentarius*. Digging out was a difficult matter; the stems were from two to four inches long, the base of each being firmly embedded in the concrete foundation of the path.—JOHN FARRAH, F.L.S., Harrogate, 29th September 1903.

GEOLOGY.

Belemnites at Caistor.—Amongst a collection of belemnites forwarded to Mr. C. G. Danford, of Reighton, collected from the Lower Cretaceous bed near Caistor, Lincolnshire, recently, he has recognised four varieties which also occur in the Speeton Clay at Speeton. These are *Belemnites lateralis*, *B. subquadratus*, *B. Russiensis*, and *B. explanatus*. The identification of these Speeton types of belemnites in Lincolnshire is of interest.—J. W. STATHER, Hull, September 1903.

Analysis of Yorkshire Chalk.—The following analysis of a piece of Middle Chalk from Little Weighton has been made for me by Mr. T. Fairley, and may be worthy of record:—

Water	...	...	...	0.41 per cent.
Organic Matter	...	...	...	0.66 "
Calcium Silicate	...	...	...	1.64 "
Oxide of Iron and Alumina	...	...	...	0.33 "
Calcium Carbonate	...	...	...	96.27 "
Magnesium Carbonate	...	...	...	0.65 "
Phosphoric Acid	...	...	...	0.04 "
				<hr/> 100.00 "

—R. DANNATT, New Holland.

GEOLOGY AT THE BRITISH ASSOCIATION.

THERE were many papers read in Section C (Geology) at the Southport Meeting of the British Association of interest to readers of 'The Naturalist.' The Presidential address of Prof. W. W. Watts was entitled, 'The Functions of Geology in Education and in Practical Life.' Prof. Watts considers that the time has come when geologists should make a firm and consistent stand for the teaching of their science in schools, technical colleges, and universities.

Mr. G. W. Lamplugh described the recent discovery of 'Land-shells in the Infra-glacial Chalk-rubble at Sewerby, near Bridlington.' The shells belong mainly, if not entirely, to *Pupa muscorum*, and occur about eight feet deep in the landwash which lies upon the buried sea-beach and is covered by the glacial drift.

Mr. J. Lomas gave a description of the 'Geology of the Country around Southport,' in which he particularly referred to the Keuper Marls and the glacial beds, and also to the post-glacial features around Southport.

'Martin Mere' was the title of a communication made by Mr. Harold Brodrick, in which he gave a summary of his remarks in the 'Handbook to Southport.'

'The Fossil Flora of the Ardwick Series of Manchester' was described by Mr. E. A. Newell Arber. He pointed out that the Binney collection and other fossil plants from the Ardwick Series had recently been re-examined, and further identifications had been made. The flora is found to belong to a palæobotanical horizon known as the Upper Transition Series, which is antecedent to the true Upper Coal-Measures.

Amongst the Committees of the Association much work is being accomplished. The fourteenth report of the Geological Photographs Committee shows that a record number of prints has been received. Amongst these the northern counties are represented as follows:—Cheshire, 23; Cumberland, 4; Derbyshire, 1; Durham, 19; Lancashire, 1; Northumberland, 3; Westmorland, 4, and Yorkshire, 60. Yorkshire, as usual, heads the list, though we fail to find any reference to the Yorkshire Geological Photographs Committee in the report. Special mention is made of the Yorkshire photographs by Mr. Godfrey Bingley and Mr. W. Jerome Harrison, and of Dr. Abbot's Durham photographs.

The report of the Committee for the investigation of the Flora and Fauna of the Trias was prepared by Mr. J. Lomas. So far the Committee's investigations have been confined to a consideration of the fossil footprints, in connection with which much has already been accomplished.

Dr. Wheelton Hind, in his report on the Life-Zones in the British Carboniferous rocks, complains of the smallness of the grant at his Committee's disposal. Details are given of some borings put down between the river Lune and river Balder, tributaries of the Tees.

The Committee appointed to make 'Observations on Changes in the Sea Coast of the United Kingdom' has presented a report which is one of the most useful of their valuable reports that has been issued for a long time. It includes a summary of all previous reports, dealing with the whole of the coastline of our islands. This enormous work was undertaken by Mr. John Parkinson, of Cambridge, and that portion relating to the North-east coast of England is particularly interesting.

The report of the Erratic Blocks Committee was presented by Mr. P. F. Kendall, the Secretary. It includes a summary of the records from all previous reports, which will be most useful to those interested in glacial geology. We hope shortly to print the Yorkshire portion in 'The Naturalist.' The records are given in alphabetical order of localities under headings of counties. The Northern Counties are represented by the following numbers:—Northumberland, 4 localities; Durham, 16; Cumberland, 3; Westmoreland, 25; Lancashire, 45; Yorkshire, 275; Cheshire, 54; Derbyshire, 8.

Particulars of the work of the Committee appointed to investigate the deposit at Kirmington will be found on another page.

NORTHERN NEWS.

Mr. J. W. Baldwin contributes a few notes on the 'Land Shells of the Turton District' to the October 'Journal of Conchology.'

Seals still seem to be common on the East coast. During the last few weeks they have been recorded at Aldborough, Bridlington, and other places.

A Nature Study Exhibition and Conference in connection with the East Riding Nature Study Committee is to be held at Beverley, on Saturday, 21st November.

Judging from various reports there appears to have been quite an invasion of the Painted Lady (*Vanessa cardui*) along the east coast towards the end of September. In some places they were seen in great numbers.

The Rev. J. Conway Walter informs us that an Albino Hare has been shot in the parish of Kirkstead, and sent to Mr. Stafford Walter, of Horn-castle, who has also received a young Crossbill shot at Asgarby, near Horncastle, by mistake for a sparrow.

A model of a piece of field work that might with advantage be followed up by various field clubs throughout the county is to be found in the 'Halifax Naturalist' for October. This is a short paper on 'The Distribution and Association of Mosses and Hepatics in the Parish of Halifax,' by C. Crossland, F.L.S.

The July 'Essex Naturalist' records (p. 85) that a fine specimen of the British Marten (*Mustela martes* L.) had been presented to the club's museum by Mr. T. E. Harting. The animal was killed in Wastdale, Cumberland, in October 1887, and had been engraved by Mr. G. E. Lodge for a plate in 'The Zoologist,' 1891.

An exceedingly valuable paper on 'Bird Migration in Solway' appears in 'The Annals of Scottish Natural History' for October, from the pen of Mr. Robert Service. The author finds that the dates of arrival of the spring migrants are earlier on the west coast of England and Scotland than on the same latitude of the east coast.

At the meeting of the Royal Horticultural Society held in the Drill Hall, Victoria Street, London, on 15th September, Dr. M. C. Cooke gave a lecture on 'Edible Fungi.' In connection with this an exhibit of Yorkshire fungi was made by the Secretary of the Yorkshire Mycological Committee. At the same meeting Mr. C. Crossland, F.L.S., was awarded a Banksian silver medal for his exhibit of fungi.

At a recent meeting of the Hull Scientific and Field Naturalists' Society, Mr. T. Petch stated that about fifty species of Mycetozoa had been discovered in the East Riding during the past year, chiefly in the neighbourhood of Hedon and Aldborough. With a view to the publication of a complete list of these organisms for this area, Mr. Petch will be glad to receive specimens, or information of previous records, etc. These should be addressed to 97, Fillebrook Road, Leytonstone, E.

The papers of particular interest to our readers in the 'Southport Handbook' are:— 'Analyses of Southport Water,' by J. C. Thresh; 'Meteorology,' by J. Baxendell; 'Geology,' by H. Brodrick and E. Dickson; 'The Ribble Estuary,' by E. Dickson; 'Botany,' by W. H. Stansfield and H. Ball; '*Hypopitys monotropa* Crantz,' by H. Ball; 'Mosses and Hepaticæ,' by J. A. Wheldon; 'Foraminifera,' by G. W. Chaster; 'Lepidoptera,' by E. N. Pierce and J. R. Charnley; 'Coleoptera,' by G. W. Chaster and E. J. Burgess Sopp; 'Araneæ,' by A. R. Jackson; 'Mollusca,' by G. W. Chaster; 'Marine Fauna and Fisheries,' by Prof. W. A. Herdman and J. C. Thompson; 'The Vertebrate Fauna'; 'Martin Mere and its Antiquities,' by H. Brodrick; 'Archæology,' by W. Brunt; and 'The Life and Works of Rev. Jeremiah Horrox,' by G. Napier Clark.

YORKSHIRE NATURALISTS' SOCIETIES.

THE following particulars have been extracted from the last annual returns supplied to the Secretary of the Yorkshire Naturalists' Union by the various affiliated societies. It will be seen that for the 31 societies there is a total membership of 2,648, or an average of 85 members for each society. We trust that the future will show an increase in these figures, as well as in the number of affiliated societies.

Name of Society.	Name and Address of Secretary.	Number of Members.	Annual Subscription.	Meetings.	Publications.
Ackworth School Natural History Society.	E. B. Collinson, Ackworth School, near Pontefract.	70	1/6	Fortnightly during term.	—
Barnsley Naturalists' and Scientific Society.	H. Wade, 10, Pitt Street, Barnsley.	132	10/6, 6/- and 3/-	Fortnightly.	—
Bradford Naturalists' and Microscopical Society.	F. Jowett, Gilstead, Bingley.	66	4/-	Fortnightly.	—
Bradford Scientific Association.	E. J. Sutcliffe, 256, Killinghall Road, Bradford.	217	e.f. 1/- 5/- and 2/6	Weekly.	—
Clayton West Naturalists' Society.	F. Lawton, Carlton Terrace, Skelmanthorpe, Huddersfield.	11	2/-	Monthly.	—
Cleveland Naturalists' Field Club.	T. A. Lofthouse, 62, Albert Road, Middlesbrough.	110	5/-	Monthly.	Annual Proceedings.
Craven Naturalists' Association.	T. H. Holmes, 2, Craven Terrace, Skipton.	98	10/6 & 2/6	Monthly.	—
Darlington and Teesdale Naturalists' Field Club.	G. Best, 20, Bondgate, Darlington.	61	5/-	Weekly.	—
Doncaster Scientific Society.	H. H. Corbett, 9, Priory Place, Doncaster.	124	3/6	Fortnightly.	—
Elland Naturalists' Society.	M. Conder, 24, Timber Street, Elland.	26	5/-	Fortnightly.	—
Halifax Scientific Society.	F. Barker, 11, Hall Street, Halifax.	148	2/6	Fortnightly.	'Halifax Naturalist,' bi-monthly.
Heckmondwike Naturalists' Society.	F. G. Stansfield, jun., 27, Francis Street, Heckmondwike.	30	4/-	Fortnightly.	—
Huddersfield Naturalists' and Photographic Society.	W. E. L. Wattam, 54, Towngate, Newsome, Huddersfield.	132	4/-	Monthly.	Annual Report.
Hull Scientific and Field Naturalists' Club.	T. Sheppard, F.G.S., The Museum, Hull.	177	5/- and 3/-	Fortnightly in summer, weekly in winter.	Annual Transactions.
Hull Geological Society.	J. W. Stather, F.G.S., 16, Louis Street, Hull.	76	5/-	Monthly.	Annual Transactions.
Leeds Conchological Club.	W. Denison Roebuck, F.L.S., 259, Hyde Park Road, Leeds.	8	Levy.	Monthly.	—
Leeds Co-operative Naturalists' Field Club.	W. Ingleby, 43, Regent Park Terrace, Leeds.	75	1/-	Weekly.	—

e.f. = Entrance fee.

YORKSHIRE NATURALISTS' SOCIETIES—*continued.*

Name of Society.	Name and Address of Secretary.	Number of Members.	Annual Subscription.	Meetings.	Publications.
Leeds Geological Association.	W. Parsons, Horsforth, Leeds.	77	5/-	Monthly.	Transactions occasionally.
Leeds Naturalists' Club and Scientific Association.	W. M. Rankin, B.Sc., 41, Wellclose Terrace, Leeds.	92	6/-	Fort-nightly.	—
Malton Naturalists' Society.	Rev. F. J. R. Young, 9, East Mount, Malton.	92	5/- and 2/6	Fort-nightly.	Annual Report.
Milnsbridge Naturalists' Society.	B. Goldthorpe, 12, Spring Gardens, Milnsbridge.	150	10/-, 5/-, 2/6 and 1/-	Weekly.	—
Ravensthorpe Naturalists' Society.	H. Parkinson, 2, Garden Terrace, Ravensthorpe.	43	1/3	Monthly.	—
Ripon Naturalists' Club and Literary and Scientific Association.	B. M. Smith, Dulce Domum, Ripon.	61	4/-	Monthly.	—
Rotherham Naturalists' Society.	G. Howard, Sitwell Vale, Moorgate, Rotherham.	21	5/- and 2/6	Fort-nightly.	—
Scarborough Field Naturalists' Society.	E. B. Lotherington, 17, Grange Avenue, Scarborough.	83	4/- e.f. 1/-	Fort-nightly.	—
Scarborough Philosophical and Archæological Society.	H. Ascough Chapman, 13, Westborough, Scarborough.	100	£1, 10/- and 5/-	Every 3 weeks in winter.	Annual Report.
Sheffield Naturalists' Club.	C. Bradshaw, F.C.S., Public Museum, Sheffield.	166	10/- and 5/-	Monthly.	Annual Report.
Thirsk and District Field Club.	R. T. Tennant, York City and County Bank, Thirsk.	63	2/6	Monthly.	—
Wakefield Naturalists' Society.	H. G. Townsend, Myrtle House, Altofts, Normanton.	34	2/6	Fort-nightly in winter.	—
West Vale Naturalists' Society.	J. W. Denton, Green Lane, West Vale, near Halifax.	52			—
York and District Field Naturalists' Society.	Rev. T. A. Brode, B.A., 3, Penley Grove Street, York.	60	4/-	Fort-nightly.	—

e.f.=Entrance fee.

BIRDS.

Swallow's Nest and Eggs in August.—On 19th August a Swallow's nest containing four eggs was found at Thorp Garth, Aldborough, East Yorks.—T. PETCH, Hedon.

Bird Migration Notes from Flamborough.—The first flight of Woodcock occurred on the Yorkshire coast on 9th October, and several were flushed in different parts of Flamborough Headland. On the previous day the wind had been easterly, bringing over a large number of Golden-crested Wrens and other small migrants. Two Rough-legged Buzzards also appeared, one of which was shot.—T. H. NELSON, 13th October 1903.

Naturalist,

NOTES ON YORKSHIRE BRYOPHYTES.

II. *PALLAVICINIA FLOTOWIANA*.

F. CAVERS, B.Sc., F.L.S.

(Continued from 'The Naturalist' for November, p. 444.)

WHERE forking of the thallus takes place, each strand becomes broader and then divides into two, which pass into the branch on the corresponding side; at this point a cross-section shows four strands lying side by side.

The actual proof that these strands serve to conduct water was obtained as the result of some simple experiments. Plants were fixed with the posterior end of the midrib dipping into watery solutions of eosin and other stains. It was found in every case that the coloured liquid travelled through the strand-cells much more rapidly than through the surrounding cells. As a rule about half an hour sufficed for the staining solution to travel nearly the whole length of the thallus and to become recognisable in sections taken a little behind the apex, whilst the stain diffused gradually through the tissue around and between the strands. A more striking result was obtained in the following way:—A plant was fixed upright with its lower end in a watery solution of potassium ferricyanide, and after a short time (10-20 minutes) rinsed in water and dipped for about the same time in a watery solution of ferrous sulphate. It was then placed in alcohol, when the midrib showed clearly two dark-blue streaks, indicating the position of the precipitate ('Turnbull's blue'). Sections showed that the precipitate had been deposited in the strand-cells, where the two solutions had mingled. When the plant had been dipped in each solution for a longer time, the cells around the strands also contained a good deal of the precipitate.

The plants from Coatham were cultivated for several months in shallow, glass-covered dishes, kept moist and well-exposed to the light. They remained healthy and produced new branches, but it was found that the latter usually showed no trace of conducting-strands, the tissue of the midrib consisting of nearly uniform cells. There was no trace of lignification in the cell-walls, nor of any elongated cells in the position usually occupied by the strands, and on cutting off these new branches and dipping the cut end in staining solutions, the latter were found to rise slowly and uniformly through the tissue of the midrib. It is obvious that when the plants are kept in constantly moist surroundings there is no longer any necessity for the differentia-

tion of tissues adapted for the conduction and storage of water, such as would be the case when growing on sandy soil and exposed to periods of drought. The writer has observed analogous modifications in the internal structure of other thal-loid Hepaticæ which had been cultivated indoors in the same manner. In *Fegatella conica* the large mucilage-sacs normally present in the midrib are poorly developed or absent in plants grown under cover and kept constantly moist. In the case of *Preissia commutata* the dark-coloured and thick-walled fibres which are so characteristic of the plant in its natural habitat were found to be absent from the midrib of the new branches produced under cultivation in moist surroundings.

The antheridia and archegonia are borne on separate plants, which scarcely differ in other respects. In the male plant

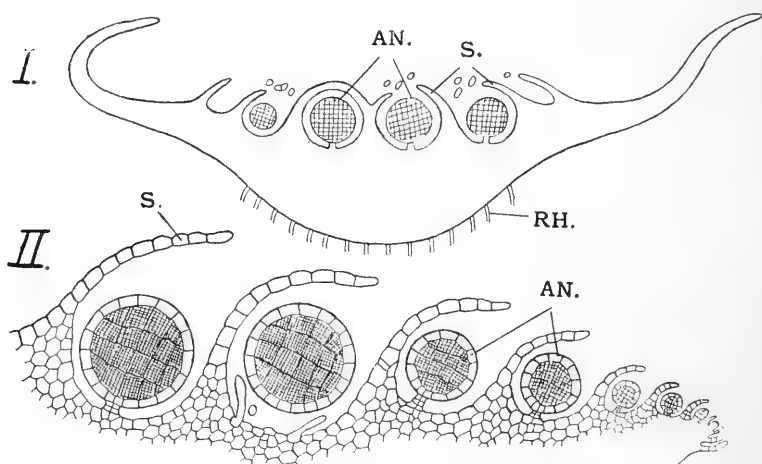


Fig. 4.—Transverse (I.) and longitudinal (II.) sections of a male plant, showing the antheridia An.) and the scales (S.) covering them; Rh., rhizoids. I. $\times 25$, II. $\times 70$.

(Plate, I.) the antheridia are produced in large numbers on the upper surface of the midrib. Each antheridium is nearly spherical, with a short stalk, and is covered by a scale which arises immediately behind it and grows forwards like a hood (Fig. 4). These scales have their free margins cut up into irregular pointed lobes, and sometimes several of them grow together, as in *Petalophyllum*, so as to form a network of chambers, each occupied by an antheridium. The antheridia are usually accompanied by mucilage-hairs (paraphyses), each consisting of a single row of cells.

The archegonia are developed in groups, of which there may be several on the same plant, standing on the dorsal surface of the midrib. Each group contains several (10-20) archegonia, and is at first surrounded by a number of narrow, scale-like outgrowths from the surface of the midrib, together with mucilage-hairs. The scales become later joined at the base and grow together, forming a short toothed sheath (involucre) around the group. The archegonia standing nearest the apex of the thallus are the youngest in the group, and a fairly complete series of stages in the development of these organs may be observed in a single group. After a time there appears, within the toothed involucre, a ring of tissue which grows up and gives rise to an inner sheath (perianth), the margin of which is entire or slightly lobed. Should none of the archegonia in the group be fertilised, the perianth remains very short, but immediately fertilisation occurs the growth of the perianth is resumed and it soon becomes much longer than the involucre, which remains as a fringe round its base (Plate, II.).

A longitudinal section through a half-ripe sporogonium shows a well-marked division into capsule, seta, and foot (Fig. 5, I.). The foot is conical and penetrates the tissue of the midrib; the seta consists of longitudinal rows of short cells. In the capsule the wall is seen to consist of 4-6 (mostly 5) layers of cells, the outer layer being nearly as thick as the inner layers taken together and consisting of large cells, roughly cubical in form (Fig. 5, II.). The elaters and spore-forming cells show a fairly regular arrangement in alternating longitudinal rows. A similar section through a ripe sporogonium still enclosed in the calyptra shows that the short and broad cells of the seta are packed with small starch-grains. The cells forming the outer layer of the capsule-wall (Fig. 5, III.) now have their lateral walls thickened and coloured deep brown, whilst the cells of the inner layers have lost their protoplasm and become flattened and disorganised, so that the capsule-wall consists practically of a single layer of large oblong cells. The outer and inner tangential walls of these cells remain thin, but the radial walls are greatly thickened and of a deep brown colour. Towards both the base and the apex of the capsule, however, some of the inner cells of the capsule-wall persist, and in these regions we find on the inner surface of the large-celled layer a number of narrow cells, the walls of which often bear irregularly ring-shaped brown thickening-bands.

The capsule eventually bursts through the calyptra and is carried up to a height of 30 mm. or more by the elongation of

the seta. This elongation takes place in a few days and is due simply to the rapid growth in length of the cells already formed, the starch-grains being used up in the process and ultimately disappearing. The dehiscence of the capsule takes place by two, three, or four longitudinal slits extending from the apex to the base. When there are two slits, each of the two valves of the open capsule is notched (Plate, IV.). Sometimes the dehiscent capsule shows three valves, one notched, the others entire (Plate, V.); or there may be four entire valves. In any

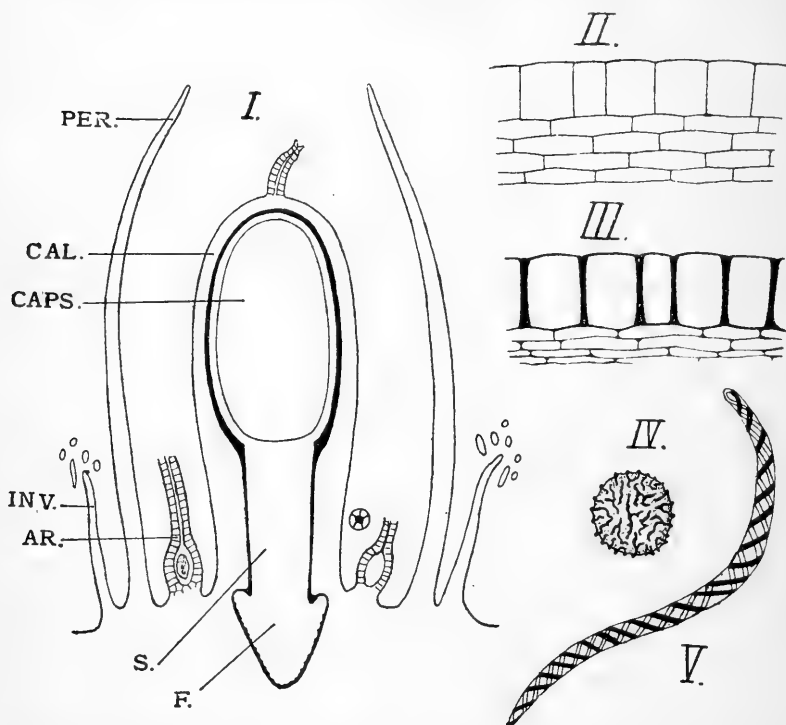


Fig. 5.—I. Longitudinal section of perianth (Per.) with a nearly ripe sporogonium, enclosed in its calyptra (Cal.). Caps., capsule; Inv., involucre; Ar., unfertilised archegonium; S., seta, and F., foot of sporogonium. II. Part of transverse section through wall of young capsule. III. Similar section of mature capsule. IV. Spore. V. Elater. I. $\times 25$; II. and III. $\times 180$; IV. and V. $\times 250$.

case, the examination of the ripe but intact capsule shows that the wall is marked by four longitudinal lines which meet at the apex and in which the cells are relatively thin-walled. The actual dehiscence may occur along all of these lines or only along two or three of them.

The spores, which measure on an average 0.04 mm. in diameter, have a thick outer coat (exospore) which is covered with irregular ridges, sometimes connected so as to form a network (Fig. 5, IV.). The elaters are 0.2 to 0.3 mm. long and about 0.01 mm. in maximum diameter, and show two or sometimes three spiral bands. Occasionally one meets with branched Y-shaped elaters, and both at the apex and the base of the capsule there occur some elaters differing from the others in being attached to the inner surface of the capsule-wall. These fixed elaters are usually shorter and wider than the free ones, and sometimes show annular instead of spiral thickening-bands.

EXPLANATION OF PLATE.

I. Male plant, from above, showing the broad midrib covered by toothed scales (male bracts), each of which forms a hood over an antheridium, $\times 5$. II. Female plant, from above. Six archegonial groups are seen. In the four younger groups the archegonia are surrounded by the involucral leaves (female bracts), the perianth not yet being developed; in the two older groups the perianth is represented as being transparent, to show the half-ripe sporogonium within it, $\times 5$. III. Female plant, bearing two ripe sporogonia; in each case the seta has become elongated, carrying up the capsule, which has not yet dehisced, $\times 5$. IV. and V. Ripe capsules, showing different modes of dehiscence, $\times 8$. VI. Upper portion of one of the valves of a capsule, $\times 40$.

MUTILLA EUROPÆA NEAR SCARBOROUGH: AN ADDITION TO THE YORKSHIRE FAUNA.

REV. W. C. HEY,

West Ayton.

A SPECIMEN of *Mutilla europæa*, a solitary ant, was taken on the moors, near Scarborough, this summer. When I first saw it I was undecided as to its identification. Mr. W. Denison Roebuck, to whom the specimen was forwarded, has submitted it to Mr. Saunders, who confirms Mr. Roebuck's identification. The insect does not appear to have been recorded north of Colchester previously; the New Forest and the sandy regions (i.e., Bagshot Sands) of Surrey, Dorset, Hants, and Berkshire, are its usual habitats in England. It is strange that the identical moor upon which this *Mutilla* was found has also yielded to me many examples of insects of a much more northern type than those usually found near Scarborough.

XYLOPHASIA ZOLLIKOFERI
AT MIDDLESBROUGH:
ANOTHER ADDITION TO THE YORKSHIRE LIST.

T. ASHTON LOFTHOUSE, F.E.S.,

Linthorpe, Middlesbrough.

It being fine and mild in the early part of Saturday, 26th Sept. last, and it being my intention to be from home during the afternoon, I left instructions for 'sugar' to be put on a few posts and stems of trees in the garden at Linthorpe, Middlesbrough. When I arrived home in the evening I examined it and took a noctua off which I could not make out from anything in my collection or from any of the works on Lepidoptera at my disposal. After taking it off the setting-board I sent it through to my friend Mr. G. T. Porritt, who, after examining it and comparing it with insects in his collection, was unable to determine it, but he suggested it might be *Xylophasia zollikoferi*, and he advised me to send it to Mr. C. G. Barrett for determination. Mr. Barrett, after examining it, was uncertain as to the species, and he kindly took it to South Kensington Museum, and he along with Sir George Hampson, Bart., compared it with the European Noctuids in that collection, with the result that they pronounce it to be *Xylophasia zollikoferi*, a species of which Mr. Barrett says, 'There is one certain previous British specimen in Mr. Doubleday's collection in Bethnal Green Museum, and it is said one other.' It is perhaps worthy of note that the insect was taken in the latter part of the week in which the invasion of *Vanessa cardui* occurred in this district, along with other parts of the east coast, some of them being seen in my garden.

◆◆◆
HYMENOPTERA.

***Camponotus herculeanus* at Hull.**—In September 1902 a specimen of this large ant was taken on the Western Dock Reservation at Hull. This waste ground is made up of sweepings from the various Hull Docks, and, consequently, many animals and plants are found upon it which have been brought to this country with cargo. The above-named specimen is an addition to the British list, but, as explained, it has doubtless been brought into this country by shipping.—T. STAINFORTH, The Museum, Hull.

Naturalist.

BOTANICAL NOTES FROM THE LANCASHIRE COAST.

J. A. WHELDON, F.L.S.,

Liverpool.

BOTANISTS will regret to learn that extensive schemes are in contemplation for the further exploitation of the Lancashire coast. Ainsdale is to be converted into a thriving watering place, with a pier and extensive promenades, and connected with Formby on one side and Birkdale on the other by electric tram lines.

Those who visited Southport during the recent meeting of the British Association would sadly note how bricks and mortar and dreary promenades had encroached on the flowery sandhills. As a matter of fact, for some time now Formby and Ainsdale have afforded better results to the plant collector than the classical Southport dunes. If the projected new watering-place thrives as well and grows as rapidly as our other Lancashire coast resorts have done, another decade will witness the disappearance of several plants from this, their last, stronghold in the district. Those which delight in the drier parts of the sandhills will no doubt linger for many years, but those dependent on the spongy, marshy hollows will soon disappear before any extensive scheme of drainage. The most interesting plants of the latter class are confined to a somewhat narrow belt of ground, and as seaside towns are prone to extend mainly in a thin line along the sea front, there can be little doubt that the vegetation will be rapidly affected in an adverse manner. Field clubs would be well advised to secure specimens of the rarer insects and plants for the local museums before it is too late, as appears already to be the case with *Erythræa littoralis* Sm. and *Spiranthes autumnalis*. Plants doomed to very early destruction are *Cochlearia anglica* and *danica*, *Scirpus rufus* and *Chara contraria*; and *Viola Curtisii* is much less abundant than of old. The following plants still grow, some of them in great abundance, near Formby and Ainsdale: *Pyrola rotundifolia*, *Hypopitys multiflora*, *Centunculus minimus*, *Erythræa littoralis* and *E. pulchella*, *Epipactis palustris* and *latifolia*, *Eleocharis uniglumis*, *Scirpus cernuus*, *S. caricis*, and *rufus*, *Carex Œderi*, *Equisetum variegatum* and *Selaginella selaginoides*. These are all plants that the proposed new conditions are bound to affect, as also the curious many-flowered maritime form of *Parnassia palustris*;

at present so very plentiful. *Bartsia viscosa* will probably linger longer, as it is very partial to and appears to grow most freely in the zone where cultivation and barren sand dunes battle for supremacy. I saw all the plants mentioned above during the present season in the vicinity of Formby or Ainsdale.

The mosses of the district are equally noteworthy. During the summer of 1893, I found *Bryum neodamense* growing sparingly amongst *Hypnum Wilsoni* and *H. lycopodioides* near Formby; and in greater profusion, *Amblyodon*, *Meesea*, a large form of *Barbula tophacea*, *Bryum uliginosum*, *B. Warneum*, *B. lacustre* and *B. pendulum*. On a later date I had the pleasure of taking Dr. Braithwaite and Mr. Beesley over the same ground, when we saw a little *Bryum neodamense* in a fresh locality, this time growing amongst *Hypnum intermedium*; we also noticed a little *Bryum calophyllum*. On this occasion the most interesting discovery was *Philonotis calcarea*, in small quantity, but bearing male flowers. This species is new to the local Florula, and an addition to the list of those of our sandhill plants, which in other localities affect a calcareous soil, the necessary lime being in the present instance supplied by shell debris. That very handsome moss, *Hypnum lycopodioides* was noticed with stems 15 inches in length!

On visiting the locality a few weeks later, with Mr. D. A. Jones, the *Bryum neodamense*, and other Brya that had lined the ditch sides, and the *Philonotis*, were gone; and the aquatic *hypna* much less plentiful, most of the ditches having been 'cleaned.' But nearer the shore we saw in abundance *Bryum Warneum* and *B. calophyllum*, the latter finer and in greater profusion than I have ever seen it. *Anthoceros punctatus* still exists near Formby, and I recently found it fruiting freely in damp fallow fields near Aintree, accompanied by *Riccia glauca*.

Most of the above notes were made since the list of mosses in the British Association Handbook for 1903 was compiled. In that list I stated that *Fissidens viridulus* had disappeared from the locality near Walton. I have since found it fruiting freely in a new station near Aintree.

As the flora is slowly but surely altered, no doubt many of the very interesting species of beetles and lepidoptera, for which the district is noteworthy, will also be lost; but these appear to have been carefully investigated, and no doubt many local naturalists have several good things which will perhaps soon be unattainable in the district.

FIELD NOTES.

BIRDS.

Rough-legged Buzzard and Bohemian Waxwings near Hull.—During the last few days a fine Rough-legged Buzzard and several Bohemian Waxwings have been seen within the borough of Hull.—T. SHEPPARD, 2nd November 1903.

Late Stay of Swifts near Bradford. I noticed a Swift flying about at Baildon Green, near Bradford, on 1st October 1903. It was apparently an adult bird. No trace of the bird was seen on passing the same place about the same time a day or two afterwards. Mr. Alf. Walker informs me that he saw two Swifts at Hawksworth, near Bradford, on 16th September, and I saw over a dozen near Otley on 5th September.—E. HARPER, Bradford.

[The late stay of the Swift this year has been noticeable throughout the country.—EDS.]

Red-Spotted Bluethroat at Tees Mouth (Co. Durham).—On 19th September a rush of small immigrants took place at the Tees Mouth, the slag walls and sand hills being tenanted by Gold Crests, Robins, Redstarts, Pied Flycatchers, Willow Wrens, Chiffchaffs, Whinchats, Wheatears, and Pipits in varying degrees of abundance. Mr. C. Braithwaite, of Seaton Carew, when shooting at the Tees Mouth near the North Gare Breakwater, noticed a bird unlike any of the above in one of the holes, which flew into some long grass and was lost among the tall growth. On the following day the bird was met with in the same place, skulking among the bent grass, and was shot. It proved to be a young male Red-Spotted Bluethroat (*Cyanecula suecica*), and therefore is, as far as I can ascertain, the first authenticated instance of its occurrence in Durham. A Willow Wren and Chiffchaff, obtained on the sea wall during this rush, belong to the small yellow backed and the large dark form respectively.—C. MILBURN, Middlesbrough.



ARACHNIDA.

Argyroneta aquatica near Hull.—Quite a large and thriving colony of this interesting spider has been observed in Ryde Street Brickpond, situated within a stone's throw of the outskirts of the city of Hull. Those taken constructed their curious nests under water, and bred quite freely in captivity.—H. M. FOSTER, Hull.

East Riding Pseudoscorpions.—*Chthonius rayi* was taken amongst sticks at Tansterne, near Aldborough, 8th August, and on the same date *Cheiridium musæorum* was found in a glass of water on the dinner table at Thorp Garth, Aldborough. Mr. H. Wallis Kew, who has kindly identified both, states that the latter is an addition to the Yorkshire list.—T. PETCH, Hedon.

MOLLUSCS.

***Arion ater* var. *alba* L. in North Lancashire.**—On the evening of either the 21st or 28th of June last (a Sunday) my daughters brought to me three white slugs. As I could not make them out they were forwarded to Mr. W. Denison Roebuck. He writes that they are *Arion ater* var. *alba* L., the *Limax albus* of the Syst. Nat. of 1758. The specimens were taken at random from what was evidently a brood, on the hedge-bank between Swarthdale and the end of the lane to Swarthmore Hall. Possibly some may survive the winter and turn up next season. As Mr. Roebuck says there are not many records for the variety in Britain, it may be new to V.C. 69. I have heard that a similar slug was seen at Blawith, near Coniston Lake, last year.—S. L. PETTY, Ulverston, 18th August 1903.

LEPIDOPTERA.

***Laphygma exigua*.** Referring to the record of *L. exigua* in Yorkshire (Nat., November 1903, p. 424) a singular coincidence occurs in a simultaneous record of the species in another journal (Ents. Mo. Mag., November 1903, p. 281). There we read that four specimens were taken by Mr. W. C. Boyd, also 'at light' near Chelmsford on 23rd September, that is the day following Mr. Fieldhouse's captures. Mr. Boyd states that although he has worked 'light' for about twice a week in September for ten years in that locality the insect had never turned up before. These two records, I think, point strongly to an immigration of the species over the country this year: in the first place, because out of the twelve specimens captured only one was in really fine condition, all the others being more or less worn; and in the next place because I cannot hear of a single example having been seen in any of its known breeding haunts on the south coast, although in its hitherto most prolific locality (in South Devon), and where I have taken it myself in different seasons, my friend and often collecting colleague, Mr. J. Jäger, worked almost specially for it during nearly the whole of the past

September. It may be of interest here to mention that although Mr. Jäger did not get *exigua*, he took on the same ground, on 23rd September, a perfectly fresh specimen of *Ophiura stolidus*, a very beautiful Noctuid quite new to Britain.—GEO. T. PORRITT, Huddersfield, 5th November 1903.

FLOWERING PLANTS.

***Orobanche rubra* Sm.**—In July 1897, while looking over collections of local flowers at the Tealby flower show, I came across an *Orobanche* I did not know. Miss E. F. Lewin took it in May 1897, in Cawthorpe Wood, near Louth. I sent it on to Mr. Arthur Bennett. He forwarded it to Dr. G. Beck, author of the recent 'Monograph der Gattung *Orobanche*.' I have now received a note of its name from Mr. Bennett. It appears that Dr. Beck names it *O. alba* Stephan in Willd. Sp. Pl. iii., 350, date 1800; that is *O. epithymum* DC., 1805, and *O. rubra* Sm., 1805. But that is not all, though it is a new addition to the flora of N. Lincs., 54. Hitherto *O. rubra* has always been found in Great Britain, parasitical on *Thymus serpyllum*, on the soil of Trap rocks. Cawthorpe Woods stand on Purple Boulder Clay according to the East Lincolnshire drift map. As far as my experience goes, it is most unlikely that *Thymus* should be found on Boulder Clay, unless the wood contains an isolated patch of Sandy Glacial Gravel not shown on the map. It is a rare species, only recorded for 14 vice-counties besides Lincolnshire.—E. ADRIAN WOODRUFFE PEACOCK, Cadney, 12th October 1903.

MOSESSES.

***Tortula ruralis* var. *arenicola* on the Yorkshire Coast.**—

During a recent visit to Bridlington I came across a large quantity of *Tortula ruralis* var. *arenicola* on the cliffs to the south. I think this moss is very common on the sandy shores of the East Coast. Mr. Barnes first recorded it as a Yorkshire moss at Saltburn. Since then Mr. J. F. Robinson and myself have several times gathered it, and I found it in good fruiting condition at Spurn at the last Yorkshire Naturalists' Union meeting there. At Bridlington it was all barren, but gave quite a characteristic appearance to the cliff sides.—J. J. MARSHALL, 2nd November 1903.

FUNGI.

Filey Meeting: Correction.—By an oversight *Pleurotus variabilis* was given in the list of fungi instead of *Claudopus variabilis* (Naturalist, July 1903, p. 241).—C. CROSSLAND, Halifax.

1903 December 1.

REVIEWS AND BOOK NOTICES.

The 'Annual Report of the Huddersfield Naturalist and Photographic Society for 1903' is to hand. It contains a few brief notes on the ornithology, botany, and lepidoptera of the district. An appeal is made to the members to wipe off a very small debt, which will surely be successful.

The Fifth Quarterly Record of additions to the Hull Museum (publication No. 16, A. Brown & Sons, Hull, 1d.) has just been issued. It is principally occupied by 'Roman Remains from Lincoln' and other antiquarian matter. There are, however, records of local geological and natural history specimens recently added, including details of the very fine model of Flambray Headland, showing the zones in the chalk, presented to the Museum by Messrs. A. W. Rowe and C. Davies-Sherborn.

'Bird Notes and News' is a circular issued periodically by the Society for the Protection of Birds, 3, Hanover Square. The October issue contains many items of interest to naturalists. It is recorded that 127 persons were convicted during the year ending 30th July for offences under the Wild Birds' Protection Act. In addition there were ten convictions for cruelty to wild birds, such as neglecting to kill injured Seagulls. We sincerely trust that the remark that a Yorkshire 'naturalist' has offered £2 10s. for a single clutch of Stone Curlew is not correct.

NORTHERN NEWS.

Notes on coleoptera in Cumberland in June, by H. Donisthorpe, and coleoptera at Southport, by T. H. Beare, appear in the October 'Entomologists' Record.'

In the October 'Entomologists' Monthly Magazine' Mr. G. T. Porritt gives an account of his boating expedition in the Norfolk Broads in search of *Eschna isosceles*.

'Notes on the Natural History of the Isle of Man,' with lists of species, appear in the October 'Nature Study,' from the pens of Messrs. S. L. Mosley and W. E. L. Wattam.

Prof. Augustus Radcliffe Grote, M.A., the entomologist, who has done so much for American entomology, died on 12th September. He was a native of Liverpool.

At a recent meeting of the York and District Field Naturalists' Society, Mr. S. H. Smith exhibited a blind worm (*Anguis fragilis*), caught on Skipwith Common on 13th September.

The Annual Meeting of the Yorkshire Naturalists' Union will be held at Sheffield, by invitation of the Sheffield Naturalists' Club, on Friday, 29th January. The Sheffield Society is doing its best to ensure the meeting being a success.

Mr. G. H. Caton Haigh contributes notes on the migration of birds in North-east Lincolnshire during the autumn of 1902 to the October 'Zoologist.' In the same journal Mr. W. J. Clarke records three Grampuses at Filey on 30th August.

Mr. Philip A. Burton informs us of interesting instances of Starlings as imitators. A pair of Starlings built their nest in a grating above the master's seat in a school near Rugby. The male bird could crow as loud as any cock, and also whistled, in evident imitation of a boy's whistle of his playfellow. On another occasion his father (Mr. F. M. Burton) was gardening, and heard a Starling imitate the full song of a blackbird. His sister also heard a Starling feebly trying to imitate the bark of a dog.

Naturalist,

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Compiled and edited by

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(Continued from 'The Naturalist' for October 1903, p. 416.)

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H. W. PEARSON. NORTHERN COUNTIES.

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- EDGAR D. WELLBURN. YORK S.W. AND MID W.
On the Fish Fauna of the Yorkshire Coalfields [describing the fish remains from the Lower and Middle Coal-Measures, and recording several

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W. H. WHEELER.

YORK S.W., LINC. S., LANCASHIRE, ETC.

The Commercial uses of Peat [refers to the extensive peat deposits at Hatfield Chase, etc]. Nature, 18th April 1901, pp. 590-591.

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J. E. WILSON.

YORK S.W.

On a Glacial 'Extra-morainic' Lake occupying the Valley of the Bradford Beck [refers to the late Prof. H. Carvill Lewis's work on the glacial lakes of the Bradford district, and gives additional information]. Rep. Brit. Assn. (Bradford), 1900 (publ. 1901), pp. 755-756.

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A. SMITH WOODWARD.

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HENRY WOODWARD.

LANC. S., DERBYSHIRE.

Note on Some Carboniferous Trilobites [refers to specimens from South Lancashire, and describes and figures specimens of *Griffithides longiceps* Portlock, var. *angusta* H.W., from Derbyshire, now in the Sheffield Museum]. Geol. Mag., April 1901, pp. 152-154.

H. WOODWARD AND H. B. WOODWARD.

NORTHERN COUNTIES.

Table of British Strata, 1 p. and 4 tables, 1901.

NORTHERN NEWS.

The Rev. J. Conway Walter informs us that on November 3rd, in the parish of Haltham, near Horncastle, a Sparrow laid an egg. The weather was fine and mild.

In 'The Field' for the 10th October Mr. F. Boyes reports the recent abundance of the 'Painted Lady' in East Yorkshire, and also records 'large numbers' of the 'Clouded Yellow' at Spurn. He likewise reports the shooting of a solitary Snipe near Foston, on 30th September. In the same issue Mr. T. H. Nelson, writing from Flamborough, notes the abundance, on 21st September, of the 'Painted Lady' along the whole coastline, from Durham to Kent. There seems to have been an unusual migration this year.

Dr. H. R. Mill, writing to the *Times* on Thursday, 29th October, says:— 'This is the certainty, now established, that 1903 is to prove the wettest year since Mr. Symons established his first rain-gauge in Camden Town in 1858. During the period of 46 years there were six complete years in which the rainfall exceeded 30 in., and of these the wettest was 1878, with 34·08 in. The rainfall for the portion of 1903 from 1st January to 27th October amounts to 34·61 in., so that, to use a phrase which seems to carry much significance to the general mind, the record is broken.'

CORRESPONDENCE.

GREAT SPOTTED WOODPECKER.

Some birds of this species are white on the under parts, others brown. Can anyone explain the meaning of this difference? It seems not to be a matter of sex or age. I used to think the brown birds were from smoky localities, but I have a very brown one from Ayrshire. Is it a matter of season? Are the white birds newly moulted.—S. L. MOSLEY.

GROUSE MOORS AND DEER FORESTS.

Mr. J. A. Harvie-Brown asks for information about Grouse in Shetland. He would also like to know how to maintain 'deer-grass' in the Scotch forests.*

My information regarding Shetland was up to 2nd September last. So far as I know no English specialist advised that '300 brace' should be put down, or advised the use of English grouse at all—he knew Scotland (after a residence of years) too well to make such a mistake. It happened, I was informed at the time they were required, English grouse could be obtained and Scotch were not on the market. Many of the Scotch moors also were suffering badly from the 'grouse disease,' and further south this was not the case that year. The supply imported was in proportion to the area to be stocked. It was calculated that so many would die on transit, for, as well as the land journey from Yorkshire to Aberdeen, there was a sea voyage of 185 miles. It was also estimated that a certain proportion would succumb to a much damper, if warmer, insular climate. The circumstances of the case turned out exactly as foreseen in every way. The birds set free in batches (not put down en masse) on the Lunna estate have multiplied as expected, and have spread over the suitable heather of the archipelago. There was no reason why they should not. The birds introduced and their descendants 'are met with here and there all over the islands on suitable ling-covered spots. It is impossible to estimate their numbers, but the experiment has succeeded, and grouse shooting will begin in Shetland next season (1904).'

Turning to deer forests! I suppose, if deer pay better than grouse, sheep, or Highland cattle, the moor-soil owners are justified in making the best of their own properties. Ling, or Heather—as it is called provincially—(*Calluna erica*), does not multiply from root shoots above ground, or by underground runners. It grows from seed and seed alone. A burnt stump may put out a fresh growth, but all new plants come from seed. Everywhere on the moors the older generation of plants is dying off and a newer springs up from seed to court destruction, if a moorland is overstocked with sheep. The fresh growth from old roots not killed by fire, if continually eaten off by sheep finally ends in the destruction of the plants. Want of knowledge about plant growth in relation to soils alone accounts for the peculiar state of certain Scotch deer forests, described so accurately by Mr. Harvie-Brown. The thousands of acres of 'blackland' in a high state of cultivation which surround me suggest 'an own-countryman' solution of this deer forest difficulty. The moorland plants cannot resist it; and where 'Tom, Dick, and Harry' are willing to pay £35 per stag to a Scotch forest-owner, there should be no difficulty about cost. Firing is even a matter of indifference, but ling and bracken die away before it, and good 'sheep grasses' take their place.' I dare not name this remedy as a southerner, but Andrew Steele's 'History of Peat-Moss,' Edinburgh, 1826, contains it, and the late James F. W. Johnston 'writ a whole book about it.' If ocular demonstration regarding it is wanted a visit to Lunna, Isle of Shetland, will prove invaluable to all deer forest owners. They understand certain things perfectly in Shetland, and nothing better than the improvement of moss-turf. I, who have made it a special study, have never seen better results than I saw there.—E. ADRIAN WOODRUFFE PEACOCK, Cadney, Brigg.

* 'The Naturalist,' September, p. 337.

CLASSIFIED INDEX.

COMPILED BY W. DENISON ROEBUCK, F.L.S.

It is not an index in the strict sense of that term, but is a classified summary of the contents of the volume, arranged so as to be of assistance to active scientific investigators, the actual titles of papers not being regarded so much as the substantial nature of their contents.

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ERRATA.

Page 200, par. 2, line 4: for *L. fulvus* read *L. flavus*.

Page 355, par. 2, line 4: for *Anobium pertinax* read *A. paniceum*.

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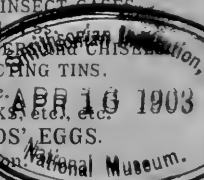
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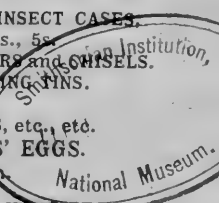
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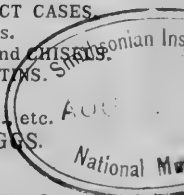
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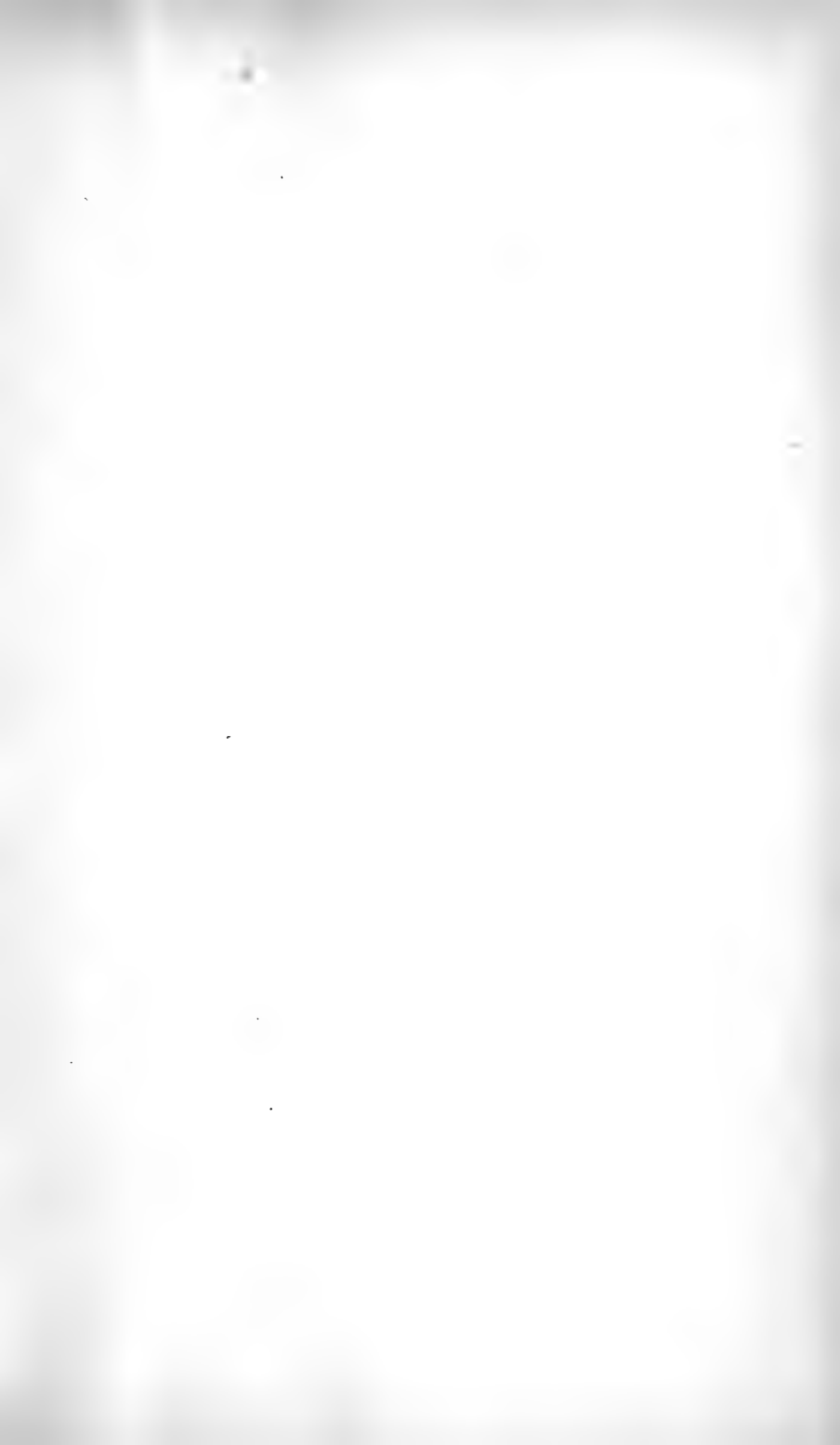
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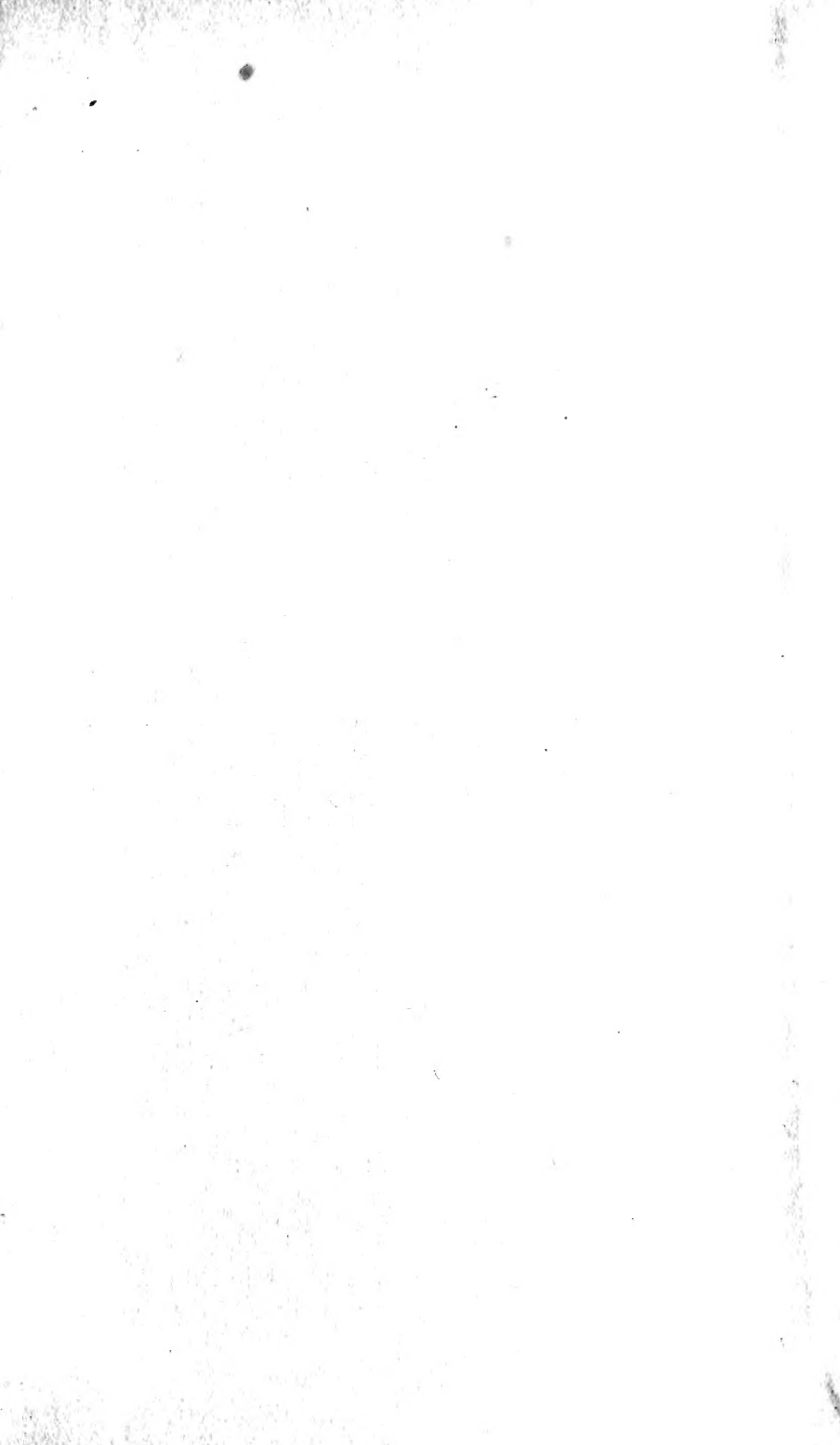
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